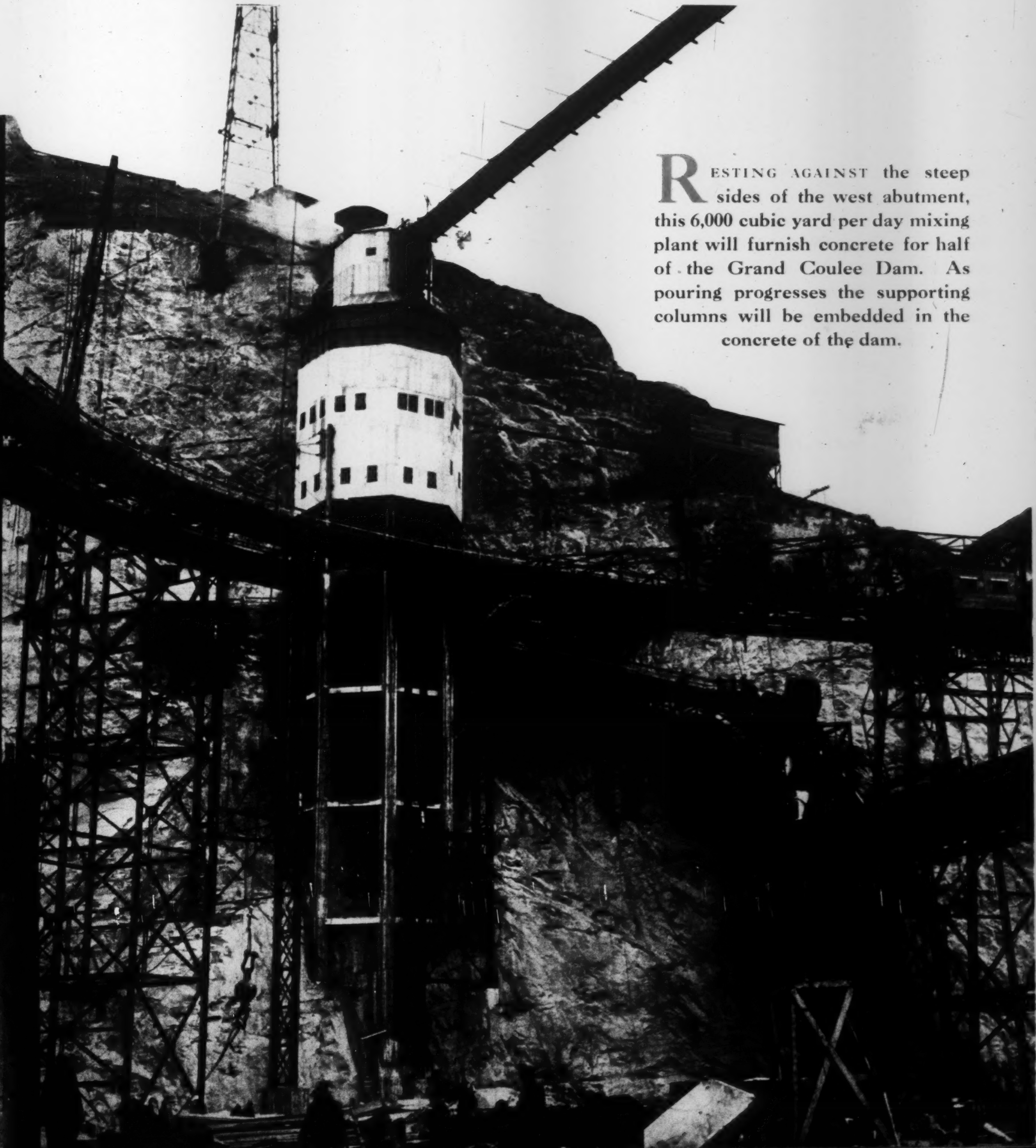
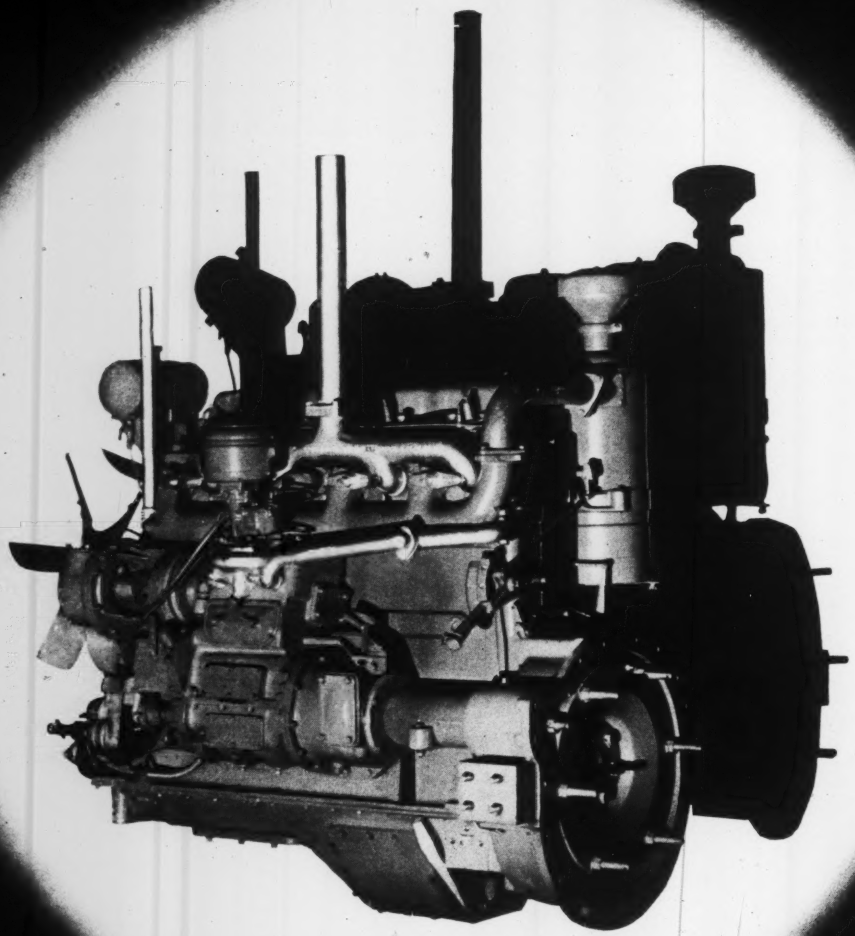
JAN 27 1936

Engineering News-Record

McGraw-Hill Publishing Company, Inc. January 23, 1936 Twenty-five Cents, Five Dollars per Year



RESTING AGAINST the steep sides of the west abutment, this 6,000 cubic yard per day mixing plant will furnish concrete for half of the Grand Coulee Dam. As pouring progresses the supporting columns will be embedded in the concrete of the dam.



FIRST FOR LOW COSTS FOR EFFICIENCY

In only a few years, "Caterpillar" Diesel Engines and Power Units have become first choice for dependable, economical shaft or generator power. They cut fuel costs to ½ or even ¼ those of gasoline engines—use cheaper fuel and less of it. And with low up-keep costs to match! They'll do your job at lower cost than ever before—and give you a profit on jobs you've never handled this way before. Simple and sturdy, "Caterpillar" power works long hours, handles a great variety of loads. Ask your dealer for a SHOW-DOWN. Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

Ranging from 47 to 160 maximum brake horsepower, "Caterpillar" Diesel power is available as engines or complete power units.

HERE ARE SHOW-DOWN FACTS

- Fuel economy is matched by low maintenance costs
- Built to high standards of precision
- The full backing of the unequalled "Caterpillar" service organization
- Extremely simple in design, easy to operate and maintain

CATERPILLAR DIESEL

REG. U. S. PAT. OFF.

A MOMENT WITH THE PUBLISHERS

THINK FAST, Harry!

(Extracts from a news report in The New York Times of Jan. 5, 1936)

"Relief workers on WPA payrolls are refusing to take jobs in private industry, it was disclosed yesterday by Victor F. Ridder, local WPA administrator. * * *

"Particularly *skilled workers on WPA rolls are unwilling to take jobs in private employment,* Mr. Ridder declared. They prefer to receive a steady pay check of $90 a month for nominal hours of work at the prevailing rate of wages and supplement their earnings with outside work.

"Mr. Ridder said he had evidence that *skilled workers receiving the prevailing rate of wages* from WPA for three days' work weekly were *also working three days for private contractors at one-half WPA wages.* * * *

"Mr. Ridder based his disclosure on a report he had just received from Major Wilfred E. Boughton, head of the WPA Industrial Reemployment Bureau. Major Boughton's functions include the placement of relief workers in private employment. He reported that he had interviewed many skilled artisans with a view to placement, but had met with little success.

"Major Boughton's report, under date of Dec. 28, 1935, released by Mr. Ridder, follows:

" 'We started interviewing the first group of skilled trades yesterday—plumbers—and some very interesting reactions were brought to light which I feel will have a direct bearing on the policies to be set up by Washington and yourself.

" 'The most important question in the minds of these men seems to be *whether or not they would be as well off if they were to accept private employment as they would be to remain on the WPA.* The majority of them feel that they are assured of at least $90 a month on WPA and are free to take outside work during their free time, so that *they will block any attempt we make to place them in private industry.*

" 'Furthermore, a large majority of them prefer the idea of a check coming in regularly, and the chance to pick up outside money. Consequently *they are hesitant to give us proper information that may lead to an early placement in private industry.*

" 'In many cases they frankly state that they do not want a return to their own line. This is particularly true of skilled workers who are *now doing office work or who are on recreation projects.*

" 'Many of these men *now make a definite statement that they will stand out against any placement in private industry, and there is nothing the government can do about it.* There are, of course, men who will take any kind of outside work they could get, but they are, according to reports of the interviews to date, in the minority.

" 'In this connection I cite another typical case—that of sheet-metal workers from a firm in the Bronx. We referred four non-union men, inasmuch as the job was a non-union job and only paid $6 a day. The men returned, stating that the employer wanted them to work only on their days off from their WPA jobs, and they were not willing to accept the job on that basis.

" 'We immediately sent an investigator to interview the employers, who stated that they were not interested in persons employed on WPA, as they had found that several people who had worked for them were absent from the job on days that they worked for WPA, and that they were dropped on account of that.

" 'They stated that the men from this office who reported there handled themselves in a very arrogant manner and stated *they were not available for work except on their days off,* and that they couldn't start work for several days because they had their time to put in on WPA.

" 'The jobs were filled by National Reemployment Service from persons not on the relief rolls. *These two instances are typical* * * *' "

Many words might be expended to point the moral of this tale but the italics, all by this writer, probably will suffice. To the thoughtful, the bare narrative itself will tell its own story most effectively. No wonder Mr. Ridder finds the problem "becoming acute" and expects to present the matter to Harry Hopkins, the WPA Administrator.

Willard Chevalier

ENGINEERING NEWS-RECORD Published every Thursday. Vol. 116, No. 4. Price 25c. per copy. Subscription, domestic, Canada, Mexico, Central and South American countries, $5 per year. All other countries $9 a year or 36 shillings. Entered as second-class matter April 11, 1917, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U.S.A. Cable Address "McGrawhill, New York." Member A.B.P. Member A.B.C.

Copyright 1936 by **McGRAW-HILL PUBLISHING COMPANY, INC., 330 WEST 42d STREET, NEW YORK, N. Y.**

Editorial and Publishing Offices: 330 West 42d St., New York; 520 N. Michigan Ave., Chicago; 883 Mission St., San Francisco; Aldwych House, London, W.C. 2, England
Branch Offices: Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta, Ga.

James H. McGraw, Jr., Chairman
Willard Chevalier, Vice-President
Malcolm Muir, President
B. R. Putnam, Treasurer
James H. McGraw, Honorary Chairman
D. C. McGraw, Secretary

Printed by The Schweinler Press, N. Y.

The 53rd Page
Year Book
1936
1935

Time's infallible hand turns the fifty-third page in the history of the House of Layne. Bright and glowing are those other pages that have gone before. They record enterprise . . . effort . . . achievement. So much so, that the wide world over, the name Layne has become a standard by which pumps, wells, and well water systems are measured.

Of the pages that are complete, Layne is proud. And the House of Layne looks on this fresh, new page as one to be made the brightest of them all.

Layne representatives everywhere stand ready to lend their advice and help in the solution of your water supply problem. A card or letter will put you in touch with the nearest one. Simply address

LAYNE & BOWLER, INC.
Dept. C—General Offices Memphis, Tenn.

LAYNE PUMPS

AND WELL WATER SYSTEMS

ENGINEERING NEWS-RECORD

Editorial Staff
V. T. Boughton
W. G. Bowman

Chicago
W. W. De Berard

McGraw-Hill Publishing Co., Inc. Editorial and Publishing Offices: 300 West 42d St., New York

F. E. Schmitt, *Editor* Willard Chevalier, *Vice-President*

Editorial Staff
C. S. Hill
H. W. Richardson
E. J. Cleary

San Francisco
N. A. Bowers

❖

CONTENTS FOR JANUARY 23, 1936

Volume 116 Number 4 Copyright 1936

The Yerba Buena Tunnel....................111
BY C. H. PURCELL, C. E. ANDREW AND G. B. WOODRUFF

Progress at San Gabriel Dam No. 1...........114
BY PAUL BAUMANN, JR.

Sewage-Sludge Incinerator at Calumet Plant..116
BY WILLIAM A. DUNDAS

Concrete Mixing and Placing at Grand Coulee.119

Bridge Railings Removable in Case of Floods..121
BY J. W. BERETTA

Current Notes on Sewage Disposal...........124

Steel and Concrete Armory in Minneapolis....125

New Brick Surface on Old Concrete Road....127
BY R. M. ANDREW

A.S.C.E. Meets in New York................131

Letters to the Editor........................135

Editorials 136

Current News 138

In the News:

Mortgage Banks—institutions that will loan money against mortgages on real estate, financing themselves in time by issuing debenture certificates against the mortgage in their portfolio—are recommended for trial in New York State by the state superintendent of insurance in his annual report to the legislature. The hope is to establish a better system of investment, to replace the guaranteed mortgage certificate and the unguaranteed mortgage bond. Mortgage banks have proved successful in 22 foreign countries.

A **Conference** of federal housing agencies is to be called by President Roosevelt to discuss plans for supplying houses costing under $5,000. New types of construction and financing will constitute the principal items for consideration.

Following Several Days of heavy rains, the swollen Sacramento River tore out 15 miles of levee and inundated more than 25,000 acres of farms and orchards in the rich farming area 125 miles northeast of San Francisco.

Tunnel Builders may play a role in reducing agricultural surpluses if the attempts made to stop underground waters menacing a mine in Illinois are successful. Hundreds of bushels of corn and soy beans were stuffed into specially drilled holes in the hope that the material would swell and stop the flow.

THE ROAD SHOW

Equipment displayed at the Cleveland Road Show, held in conjunction with the American Road Builders Association convention this week, will be described in an eight-page supplement to the Jan. 30 issue.

In This Issue:

Disposal of sewage sludge by burning—the potential advantages of which have been the subject of much study and experimentation—will have a large-scale tryout in the new Calumet plant of the Chicago Sanitary District. The equipment layout and operating procedure by which 40 tons of dried sludge will be burned daily are described by William A. Dundas, mechanical engineer of the sanitary district.

The Mechanization of concrete making reaches another new high in the plant that has just gone into operation on the Grand Coulee Dam in Washington. Perched on stilts, 250 ft. above the dam foundation at the west abutment, this new plant will turn out 320 cu.yd. of concrete per hour. A duplicate plant will be built across the river, to serve the east half of the dam.

Fixed Concrete Railings on the highway bridge over the Rio Grande River at Laredo, Tex., were found to offer as much as 50 per cent of the total resistance of the structure to the passage of floodwaters overtopping it. A new railing, designed for quick removal and ease of handling when excessive floods threaten, has now been installed. J. W. Beretta describes this unusual piece of work for which no precedent existed.

New Information regarding trickling filters, milk-waste treatment, paper-waste pollution and other matters of current interest to the sanitary engineer have been compiled for the second installment of monthly notes on sewage disposal.

All Records for tunnel size in this country are broken by the double-deck tunnel through Yerba Buena Island for the traffic lanes of the Bay Bridge at San Francisco. The structure is notable also in that it was lined before the greater part of the core was removed. The maximum width of the Yerba Buena Tunnel, 79 ft. outside the lining, is exceeded only by the 119-ft. span of the rock-chamber cut for the power house at Sautet Dam in France.

Work Has Been Resumed on San Gabriel Dam No. 1, the 375-ft. high rockfill of the Los Angeles County Flood Control District. Rock slopes have been flattened in the modified dam to permit using rock rejected as not suitable for the original design with its steeper slopes. The new design calls for rehandling more than 300,000 cu.yd. of rock already placed in the dam.

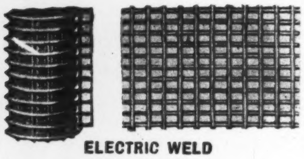
Renovating an old concrete road and reconstructing its 8½-mile length with brick surfacing presented a number of problems in determining the most efficient method of procedure. R. M. Andrew, project engineer of the Indiana Highway Commission, relates in detail how the work was carried on.

INDEX

An index for *Engineering News-Record,* Vol. 115, July-December, 1935, is published with this issue. It will be found in the section following the last news page.

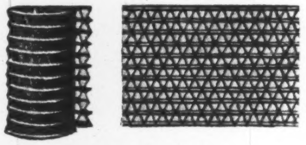
American
Steel & Wire Company
WIRE
FABRIC

FURNISHED IN ROLLS OR SHEETS



ELECTRIC WELD

There is a right type of wire fabric reinforcement for each job — right in quality and in spacing. You can have it either in rolls or sheets. Give us the facts and we will gladly recommend the style.



TRIANGLE MESH

REDUCES *the labor cost*

SPEEDS UP *the job*

If you want speed with economy in concrete construction specify American Steel and Wire Company Wire Fabric — either Electric Weld or Triangle Mesh—and you'll get it. It lays quickly and easily. It is absolutely uniform. It is the product of more than 100 years of wire making experience. In its many types of application it has proved to be the most efficient and economical reinforcing material.

Electric Welded Fabric is made from cold drawn mild steel in a square or rectangular mesh electrically welded at intersections. Various combinations of sizes and spacings of wire can be furnished according to need.

Triangle Mesh Reinforcement is made from cold drawn mild steel having a high breaking strength. The longitudinal or tension members are spaced 4 inches. The diagonal cross wires either 2, 4 or 8 inches.

Write For Illustrated Booklet giving complete data and illustrating its many applications.

US STEEL

AMERICAN STEEL & WIRE COMPANY
208 S. La Salle Street, Chicago   Empire State Building, New York
Pacific Coast Distributors: Columbia Steel Co., San Francisco.
Export Distributors: United States Steel Products Co., New York.

UNITED STATES STEEL

ENGINEERING NEWS-RECORD

January 23, 1936

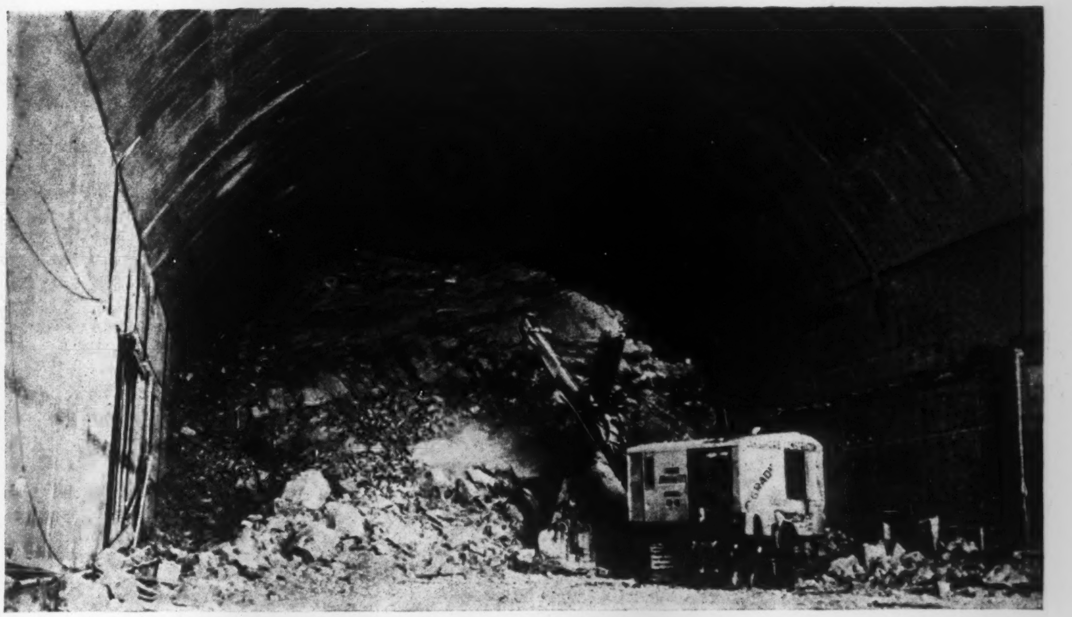


FIG. 1—EXCAVATING THE CORE of the record-size Yerba Buena Tunnel after sidewalls and roof were built in drifts.

The Yerba Buena Tunnel

The double-deck roadway of the Oakland Bridge over San Francisco Bay passes through the rocky peak of Yerba Buena Island by tunnel of record size, driven under protection of 16-in. steel beam roof supports and lined before the core was excavated

By C. H. Purcell, Charles E. Andrew and Glenn B. Woodruff

Chief Engineer, Bridge Engineer and Engineer of Design, Respectively, San Francisco-Oakland Bay Bridge

WITH the record excavation width of 79 ft. at the spring line, the Yerba Buena Tunnel, which joins the east and west channel crossings, is a major element of interest in the San Francisco-Oakland Bay Bridge project. The 540-ft. length of tunnel pierces a small rocky island (Yerba Buena) located near the middle of San Francisco Bay. The island, which rises to 345 ft. above sea level, is about 4,000 ft. long and 2,400 ft. wide and is a government reservation used by the Army, the Navy and the Lighthouse Service.

Like the bridge, the tunnel is a double-deck structure. A reinforced-concrete floor supported by the side walls of the tunnel carries a 58-ft. upper roadway and two 45-in. sidewalks, while the lower deck provides a truck roadway 31 ft. wide and 16 ft. in clearance height, as well as a lane 27 ft. wide and 20 ft. high for a double-track interurban line.

The bridge alignment, determined by other reasons (*ENR*, March 22, 1934, p. 371), made it necessary to cross the island. An open cut was considered in place of the tunnel, but its greater cost and greater interference with the government facilities on the island caused it to be rejected. Sidehill cuts along the south side of the island also were considered, but they involved structures that cost more than the tunnel and gave a less satisfactory alignment.

Before the tunnel was designed, the formation through which it passes was thoroughly explored by core drilling, and the geology of the entire island was studied. The material consists of interbedded sandstones and shales overlain by æolian sands. Especially near the west portal these strata are weathered to depths of 50 ft. The rock has been subjected to rather severe folding action and in parts of the tunnel is shattered, though not to such an extent as to involve any great difficulty in excavation or support.

Design of tunnel

The geologic survey and preliminary borings indicated that heavy vertical and lateral pressures might develop, and that unequal lateral pressures were probable. The tunnel roof arch and sidewalls therefore were designed for the three conditions shown by Fig. 4. An overburden of 100 ft. over the top

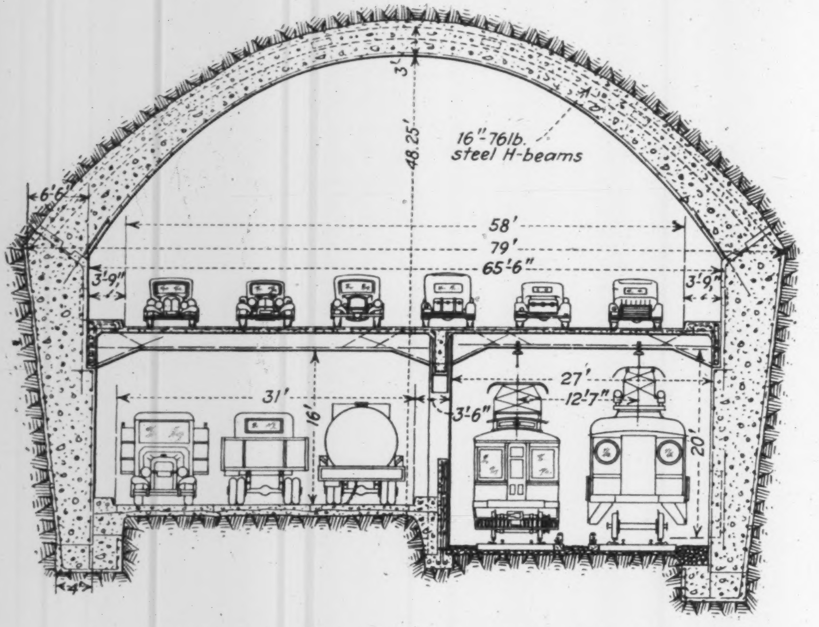
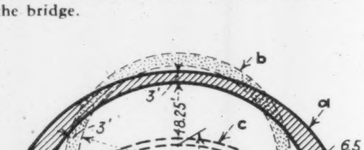


FIG. 2—CROSS-SECTION of Yerba Buena Tunnel. High-speed traffic is to be carried on the upper deck, and below this deck is space for trucks and for the transit lines operating over the bridge.

of the arch crown was assumed; the actual overburden was as much as 135 ft. In the first condition the roof was designed as an arch fixed at the spring line, with vertical load symmetrical and lateral loads unequal, as shown by Fig. 4A. In the second condition the roof and sidewalls were designed as a two-hinged arch with the hinges at the footings of the sidewalls and with symmetrical horizontal loadings as shown by Fig. 4B. In the third case the same conditions were assumed except that unequal lateral pressures were taken as acting on the vertical projection of the roof arch (Fig. 4C). Inasmuch as the upper deck could not be placed until after completion of the sidewalls and roof and the subsequent excavation of the rock core, concrete shrinkage in this deck would pull it away from the sidewalls; no reinforcing steel was placed across the construction joints between the sidewalls and the viaduct, and the strengthening effect of the viaduct as a strut between the side walls was not considered in the design.

In the design as much attention was given to construction problems as to the stresses that might be present in the completed tunnel. In order that only a small part of the tunnel need be opened at any one time, the procedure of placing the sidewalls before excavating for the arch roof was adopted. Primarily to make the construction safer, steel ribs or rings of 16-in., 76-lb. H-beams, bent to conform to the curve of the extrados, and spaced 3 ft. on centers, were made a part of the contract requirements.

The original design provided that these ribs be spanned with dished flanged plates bolted to the webs of the H-beams, and that the space between these plates and the face of the excavation be packed with spalls. Three grouting operations were specified: The first was to fill the voids in the back packing; the second, following concrete lining, was to fill probable voids at the junction of the ribs and the plates; finally, the holes used for the first grouting were to be redrilled through the back packing to the rock surface and grout was to be forced in to fill any spaces caused by shrinkage in the concrete lining and vertical deflection of the arch under dead load.



a-Yerba Buena Tunnel
b-Boulder Dam Diversion Tunnels
c-Rove Barge Canal Tunnel, Marseilles, France

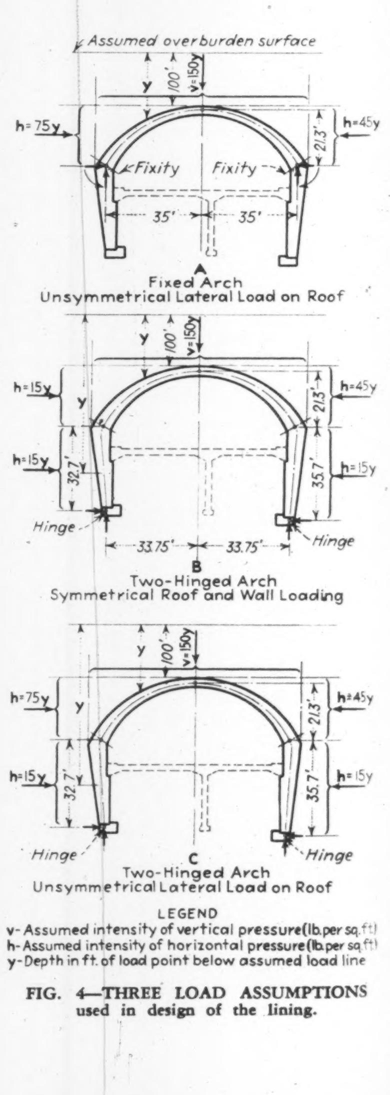
FIG. 3—COMPARATIVE SIZE of the world's largest tunnels.

In construction the plates were entirely omitted except on a 60-ft. length of the tunnel, and the space from the intrados to the excavation limits was filled with concrete. The only grouting subsequent to placing the roof concrete was the filling of the shrinkage crack between the extrados and the rock surface.

To consolidate weathered rock near the west portal, primarily to prevent raveling during construction, specifications provided that 25 holes should be drilled 200 ft. horizontally from the rock face and grouted with a pressure of not less than 100 lb. per sq.in. In order not to lose the hole by lifting the face, the contractor elected to drill and grout each hole in four stages. First a 50-ft. depth was drilled and grouted, then it was redrilled and deepened to 100 ft. and grouted again; this plan was repeated until the prescribed 200-ft. depth was reached. The total footage drilled was 12,500 ft. In the final stage, pressures as high as 400 lb. per sq.in. were used. A total of 10,448 sacks of cement were injected during the operation, or more than two sacks per linear-foot of hole. In general, the grout ran upward, and little evidence of grouting was discovered beyond the first 50 ft. from the face. It is believed, however, that this grouting greatly relieved the pressure on the steel roof supports.

Tunnel construction

In starting the tunnel, a 14x14-ft. drift was excavated for the full length of the tunnel at the bottom of each side-



A
Fixed Arch
Unsymmetrical Lateral Load on Roof

B
Two-Hinged Arch
Symmetrical Roof and Wall Loading

C
Two-Hinged Arch
Unsymmetrical Lateral Load on Roof

LEGEND
v- Assumed intensity of vertical pressure (lb. per sq. ft.)
h- Assumed intensity of horizontal pressure (lb. per sq. ft.)
y- Depth in ft. of load point below assumed load line

FIG. 4—THREE LOAD ASSUMPTIONS used in design of the lining.

wall. The two drifts were enlarged by stoping, to tunnels 14 ft. wide by 40 ft. high, a size sufficient to permit construction of the sidewalls. Muck was loaded into cars by a drag scraper loader and hauled to the dump chute. These tunnels were braced with square timber sets, 8 ft. c. to c. Concurrently a top 8x8-ft. center drift was driven. In this drift no timber was required. Fig. 6A shows this stage of the work. After completion of the side tunnels, the sidewalls were constructed; the part above foundations was placed in four lifts. These walls are shown on Fig. 6B. Timber lagging was placed against the exposed faces of the walls to prevent their being marred during excavation for the roof lining.

The next operation was to excavate for and place the roof lining, as shown by Fig. 6B. Four cross-cuts providing eight working faces were excavated from the crown heading to the sidewalls. These cuts were promptly followed by the steel rings, the excavated material being allowed to accumulate in the sidewall drifts. At the west portal the first of the steel rings was placed about 30 ft. in from the face, and the face was then cut through by working from the inside toward the portal. This operation loosened about 500 cu.yd. of rock at the portal face, which fell, carrying two sets of steel ribs with it. At the east portal there was room for three rings to be placed outside the rock face, and the cut was started from the portal. After the steel rings were placed, they were supported at the third-points of the span by timber stulls to the rock.

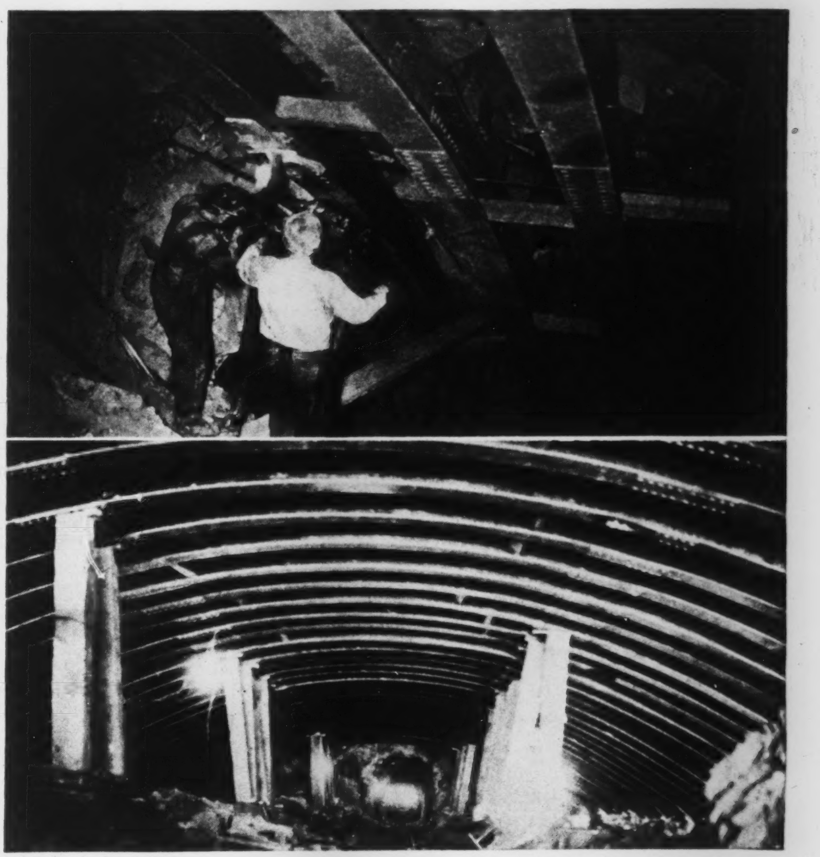


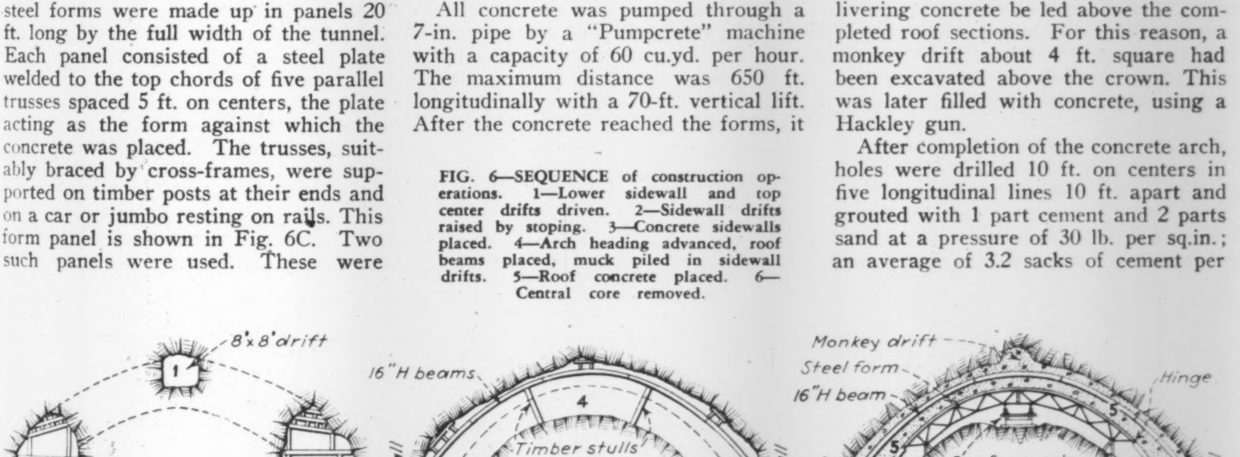
FIG. 5—ARCH HEADING was advanced under protection of steel beam roof supports (above) which were braced to top of core by timber stulls (below). Note top center heading in lower view.

The specifications called for all exposed concrete surfaces in the tunnel to be formed with either plywood or steel forms. Plywood was used for the sidewalls and steel forms for the roof. The steel forms were made up in panels 20 ft. long by the full width of the tunnel. Each panel consisted of a steel plate welded to the top chords of five parallel trusses spaced 5 ft. on centers, the plate acting as the form against which the concrete was placed. The trusses, suitably braced by cross-frames, were supported on timber posts at their ends and on a car or jumbo resting on rails. This form panel is shown in Fig. 6C. Two such panels were used. These were moved along on the rails as the work progressed; jacks served to raise them into position for concreting and to lower them for moving.

All concrete was pumped through a 7-in. pipe by a "Pumpcrete" machine with a capacity of 60 cu.yd. per hour. The maximum distance was 650 ft. longitudinally with a 70-ft. vertical lift. After the concrete reached the forms, it was compacted by internal vibrators. The sequence of placing concrete was such that for the west half of the tunnel it was necessary that the pipe for delivering concrete be led above the completed roof sections. For this reason, a monkey drift about 4 ft. square had been excavated above the crown. This was later filled with concrete, using a Hackley gun.

After completion of the concrete arch, holes were drilled 10 ft. on centers in five longitudinal lines 10 ft. apart and grouted with 1 part cement and 2 parts sand at a pressure of 30 lb. per sq.in.; an average of 3.2 sacks of cement per

FIG. 6—SEQUENCE of construction operations. 1—Lower sidewall and top center drifts driven. 2—Sidewall drifts raised by stoping. 3—Concrete sidewalls placed. 4—Arch heading advanced, roof beams placed, muck piled in sidewall drifts. 5—Roof concrete placed. 6—Central core removed.



linear-foot of arch was used. After this grouting had been done, holes spaced 40 ft. on centers on lines 30 ft. from the arch center line were drilled and grout was applied. These holes, however, refused to take grout.

Upon completion of the lining the core was excavated, working from both ends, with power shovels that loaded into trucks. The final operation of constructing the upper-deck viaduct was then begun.

Quantities

The quantities of material within the contract lines and also the additional quantities placed on account of the overbreak are as follows:

	Theoretical	Additional
Excavation, cu.yd	71,414	3,761
Concrete, cu.yd		
Sidewalls	8,326	1,822
Roof	5,816	1,748
Upper-deck viaduct	2,050	0
Steel ribs and plates, lb.	1,450,000	0
Roof grouting, sacks of cement	0	1,720

The foregoing work was done for the lump sum of $730,035. The grouting at the west portal was bid at $9.25 per barrel of cement used, or a total cost of $24,161. Other items of cost in the tunnel consisted of reinforcing steel, $29,000, and architectural portals, $118,000.

Personnel

The tunnel forms part of the contract for the Yerba Buena crossing held by the Clinton Construction Co., of which W. B. Brinker is president and Albert Huber vice-president. The tunnel construction was sublet to the T. E. Connolly Co.; William Connolly acted as superintendent. Harry Carter is resident engineer for the state. Lieut.-Commander Collins Macrae, U.S.N., represents the commandant of the Twelfth Naval District. The personnel of the California Toll Bridge Authority was listed in *ENR*, March 22, 1934, p. 377.

Progress at San Gabriel Dam No. 1 on Modified Design

Revised plans have flatter slopes, call for removal of some rock already placed, provide for hosing rockfill in central zones, and contemplate use of material formerly wasted from Quarry 10

By Paul Baumann, Jr.
Assistant Chief Engineer, Los Angeles County Flood Control District

AFTER DELAY in reaching an agreement on proposed changes in the design of the San Gabriel Dam No. 1 of the Los Angeles County Flood Control District, modified plans were approved last August. Since then work has been under way on an entirely new construction program. Principal changes in the original design consist of (1) flattening both slopes from about 1½:1 to a 3:1 slope; (2) provision for placing a jetted rockfill in four of the six zones; and (3) placing compacted fill in the other two zones. The height remains the same, about 375 ft. Like the plans themselves, the original contract has been modified and the same general contractor who has been on the job since it started has re-equipped his plant and is carrying out the reorganized construction program. An outline of flood-control work to date in the San Gabriel Canyon, including a cross-section of San Gabriel Dam No. 1 as originally designed, was published in *ENR*, Jan. 24, 1935, p. 113.

In the new plan the dam cross-section is divided into six different zones, as shown in the accompanying drawing. Zones 1, 4, 5 and 6 are to consist of dumped rock which is to be hosed with a high-pressure jet, the quantity of water used to be about twice the volume of the rock. The material is to be from Quarry No. 10 and from available excavations near by such as abutments, streambed and cutoff trench; zone 2 is to be a compacted impervious blanket of fine material; in zone 3 will be compacted quarry material that has passed or would pass through a 6x9-in. grizzly.

In defining material that may be used in the rockfill the new specifications do not put a minimum limit on strength or size of rock in the usual sense but require that, in general, large rock (exceeding ½ cu.yd. in volume) shall be put in zone 5, and that the best quality rock obtainable shall be put in zone 6. All existing rockfill that had been placed in the riverbed under the original specifications was required to be removed except that which was below a 1:1 slope with its toe 175 ft. downstream from the center line of the dam. Material so excavated was redeposited in zone 6.

As the primary purpose of zone 1 is to provide protection both as to erosion and drying out of zone 2, excavation from abutments and rock of all qualities is permitted in zone 1. However, no rock in zones 1, 4, 5 or 6 is to be placed without being hosed down with a high-pressure jet, and the ratio of rock to water is specified at approximately 1 to 2. The hosing is referred to on the job as "sluicing."

Immediately upon receiving authorization to proceed with the construction of the dam under the modified plans, the contractor began to remove the existing rockfill and to deposit in zone 1 miscellaneous excavated material and rock from other sources. Preparation for a permanent sluicing plant also was begun immediately, as was work on a fill below the downstream toe of the dam. This fill was needed to provide space for the contractor's plant, which had to be removed from its former location to make way for the wider dam.

The contractor's gravel plant, origi-

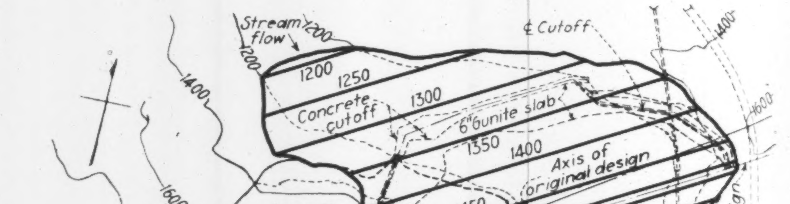


FIG. 1—PLAN OF NEW DESIGN for San Gabriel Dam No. 1, showing slopes which are half as great as originally contemplated.

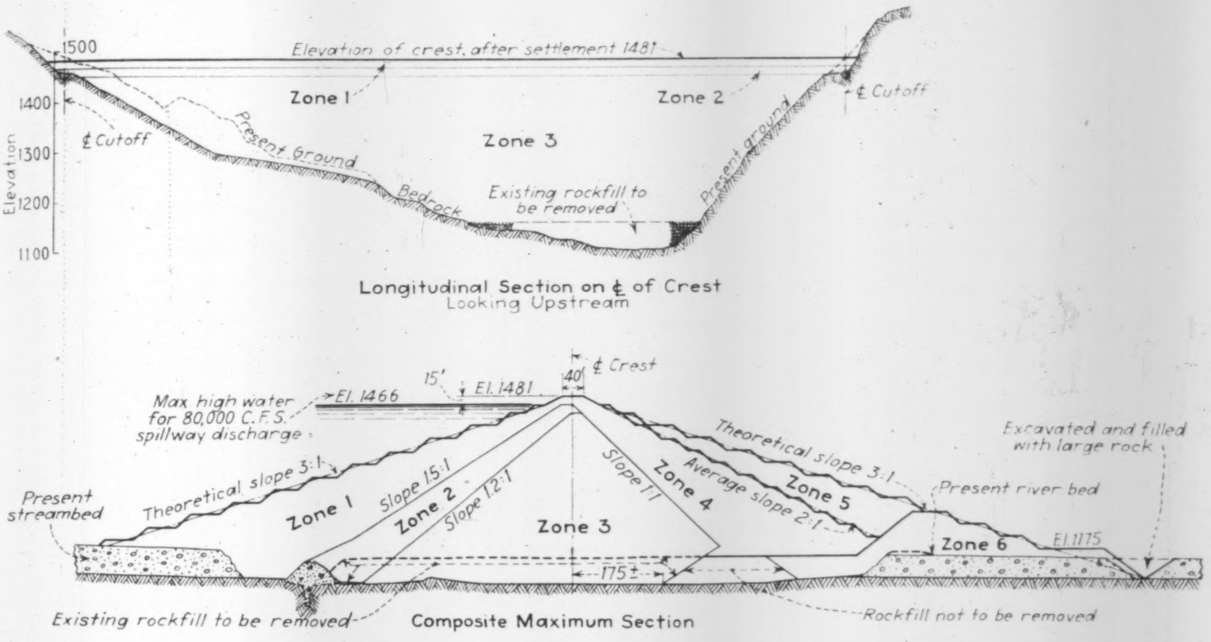

1500
Elevation of crest, after settlement 1481
1400
1300
1200
1100
Elevation
Zone 1
Zone 2
Zone 3
℄ Cutoff
℄ Cutoff
Present Ground
Present ground
Bedrock
Existing rockfill to be removed
Longitudinal Section on ℄ of Crest
Looking Upstream
℄ Crest
40'
15'
El. 1481
Max. high water for 80,000 C.F.S. spillway discharge
El. 1466
Theoretical slope 3:1
Theoretical slope 3:1
Present streambed
Zone 1
Slope 1.5:1
Zone 2
Slope 1.2:1
Zone 3
Slope 1:1
Zone 4
Average slope 2:1
Zone 5
Zone 6
Excavated and filled with large rock
Present river bed
El. 1175
175±
Existing rockfill to be removed
Composite Maximum Section
Rockfill not to be removed

FIG. 2 — TYPICAL CROSS-SECTIONS, showing zones for different materials and different methods of treatment.

nally located just above the upstream toe of the dam, likewise had to be moved to a location farther upstream, to allow for the extension of the upstream slope. Temporary sluicing plants were installed so that dewatering of the foundation could be combined with sluicing. The permanent sluicing plant is to include two vertical centrifugal pumps to be installed in the sump immediately below the downstream toe; a 16-in. welded pipe line from the pumping plant to an equalizing tank located near the center line of the dam above the east abutment, with its floor at El. 1,600; and a main feeder line 12 in. in diameter running along the east abutment to the extreme north end of the fill. The capacity of each of the pumps is 2,250 gal. for a 500-ft. head and approximately 3,000 g.p.m. for a 425-ft. head. The pump capacity was computed on the basis of a maximum output of 1,000 cu.yd. of rock per hour, which calls for 2,000 cu.yd. of water per hour.

Material in zone 2 is to be compacted to a minimum dry density of 115 lb. per cu.ft.; the material in zone 3, which, as previously stated, consists of quarry run that passed a 6x9-in. grizzly, is to be compacted to a minimum dry density of the fines of 120 lb. per cu.ft.

The nature of the rock in the San Gabriel Canyon makes it desirable to do as little blasting as possible, particularly along the cutoff which approximately follows the upstream contact of zone 2. Special study was given to means of thoroughly grouting the rock along the cutoff wall. Specifications on this item call for 8-in. grout holes drilled in two rows 5 ft. apart, with a staggered spacing between holes of 10 ft. These grout holes vary in depth from 50 to 150 ft. A 2-in. pipe is to be inserted in the 8-in. grout hole to within a short distance of the bottom, and grout will be forced through the pipe, displacing the air as it rises in the hole. This grouting is to be done at relatively low pressures.

Quarry No. 10 is located on the east side of the canyon. An extension of the quarry, considered as a new branch of quarry 10, has been opened up on the west side of the canyon in a location where the excavation will remove most of the yardage from the spillway channel. Completion of the spillway proper is to be carried out under a separate contract.

The diversion channel through which the river flow is bypassed around the dam during construction is a circular tunnel 30 ft. in diameter. This is to remain unobstructed until the spillway is completed. Subsequently, control works will be built in this tunnel for the purpose of controlling the discharge from the dam.

The following quantities were moved in the 3½-month period after work was resumed on Aug. 12, 1935:

Contract Work

Excavation in abutments and streambed	108,672 cu.yd.
Extension of cutoff-wall excavation	709 cu.yd.
Concrete placed in cutoff trench	363 cu.yd.
Eight-in. holes drilled and grouted	325 lin.ft.
Rockfill placed in the dam	101,996 cu.yd.
Six-in. gunite blanket placed on bedrock under zone 2	11,735 sq.ft.
Preparation for extension of quarry No. 10 unit No. 1, to approximately El. 2,000	

Extra Work

Installation of temporary and permanent sluicing plants, the latter designed for a maximum of 15 sec.-ft. with a 1,400,000-gal. equalizing tank at El. 1,600. The pumping plant is to consist of two centrifugal vertical pumps rated at 400 hp. each.

Excavating and redepositing 325,000 cu.yd. of rock previously placed in the riverbed.

Sluicing 442,495 cu.yd. of rockfill in zones 1, 4 and 6.

Sprinkling and compacting 2,816 cu.yd. of fine material in zone 2. In zone 3, sprinkling and compacting 5,488 cu.yd. of material that had passed through a 6x9-in. grizzly.

Moving and rebuilding contractor's plant, to allow for extended slopes of dam both upstream and downstream.

C. H. Howell is chief engineer of the Los Angeles County Flood Control District and E. R. Stuver is resident engineer at the dam. Contract for construction of San Gabriel Dam No. 1 is held by the West Slope Construction Co.

◆

Mexico Plans Extensions To Highway System

The Mexican federal and state governments will spend $10,000,000 for highway works next year to expand the trunk-road network to about one-third of the area of Mexico, finish national highways now under construction and begin work on several local and branch roads that are necessary for the expansion of industrial and agricultural activities.

The road work funds are to be contributed half by the federal and half by the state governments. Of the 1936 investment, $6,666,000 will be spent on state, local and branch roads in various parts of the country, but especially in Jalisco, Michoacan, Coahuila, Sonora, Aguascalientes, Tamaulipas, Guanajuato, Queretaro and Morelos states.

The 1936 road work budget allowance is to contain an appropriation of $1,400,000 for completing the international highway between Mexico City and Nuevo Laredo on the American border. This road is to be officially inaugurated at the end of May, 1936.

Sewage-Sludge Incinerator Introduced at Calumet

Drying and incineration is Chicago's solution of the problem of complete disposal of a daily load of 40 dry tons of putrescible solids emanating from the Calumet activated-sludge sewage-treatment plant recently placed in operation

By William A. Dundas
Mechanical Engineer, Sanitary District of Chicago

HEATED vapor drying and combustion in suspension comprise the basic principles of the sludge-disposal process selected for the new Calumet sewage-treatment works of the Sanitary District of Chicago, where an average daily load of 40 tons of dry putrescible solids will be reduced to an odorless, inert ash in the sludge-handling plant employing mechanical dewatering, flash drying and suspension-burning equipment. This installation is operated so that the combustion cycle is connected to the drying cycle through a vapor heater which furnishes superheated vapor for the evaporation of moisture from the filtered sludge cake before it is burned.

The Calumet plant, placed in operation on December 3, 1935, is of the activated-sludge type with an average capacity of 136 m.g.d. and a maximum of 204 m.g.d. It replaces an existing installation of Imhoff tanks that have been used since 1922 and will serve an estimated population of 390,000 in the 88-sq.mi. area south of 87th St. The present tributary population is approximately 300,000, which will be increased when intercepting sewers for the entire area are completed. The total suspended solids contributed per capita per year will be 110 lb., of which 90 per cent will be removed in the process of treatment for disposal in the sludge incinerator. In order to reduce the required maximum capacity of the sludge-handling plant, it is intended to store solids temporarily in the aeration system at times of peak load by building up the mixed liquor concentration. The excess solids so retained in the aeration system will be drawn off when the load coming to the plant returns to normal.

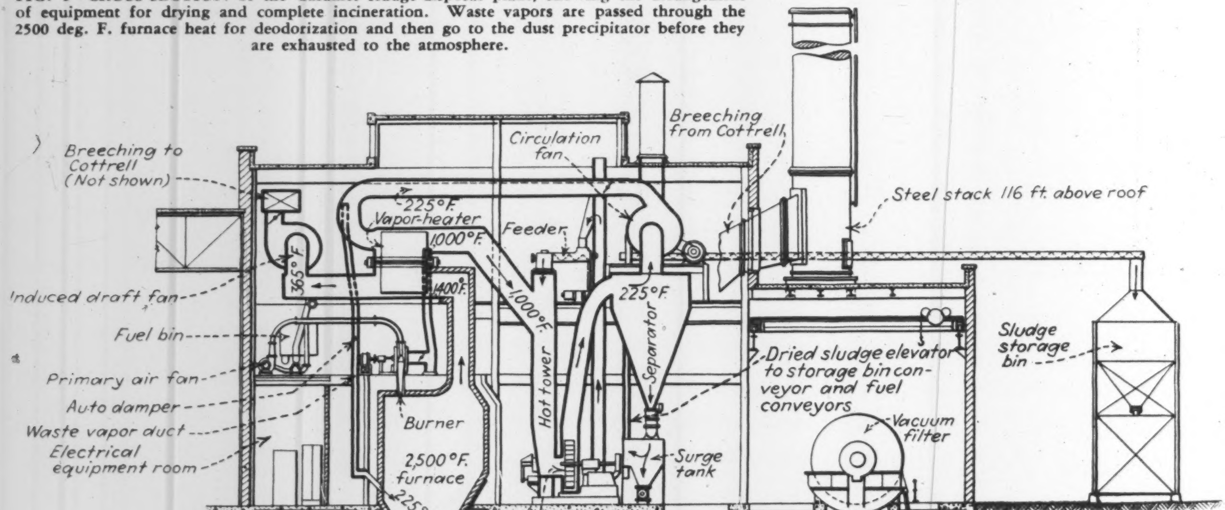
Briefly, in the order of their application, the incinerator equipment includes sludge-conditioning appliances, continuous rotary vacuum filters, cage mill dryers and auxiliaries, vapor heaters, furnaces with their firing appurtenances, an electrical dust precipitator and a wrought-iron smokestack. Fig. 1 represents a typical cross-section through the plant, showing the comparative sizes and location of the equipment. In a few instances the drawing has been made diagrammatic to show more clearly the flow of gases or materials. Fig. 2 is a composite plan of the plant. The left-hand portion of the figure shows the layout above the furnaces, while the right-hand portion shows the arrangement above the vapor heaters.

Conditioning and dewatering

Prior to incineration, waste activated sludge from the final settling tank, sludge and grit from the preliminary settling tank and pulped screenings are brought to two concentration tanks to prepare the mixture for filtration. Each concentration tank is 80 ft. long by 17 ft. wide, and has a water depth of 10½ ft. Effluent troughs are provided for skimming off the supernatant liquor, which is returned to the aeration system for treatment. Sludge is removed by scraper conveyors to discharge pipes leading to the sludge-disposal building.

The thickened mixture of sludge drawn from the concentration tanks is pumped to the sludge-mixing flume shown in Fig. 3, where it will be dosed with 4 to 6 per cent of ferric chloride, proportioned by dry weight. The mixing flume is a rectangular steel box through which the sludge flows longitudinally while being dosed with ferric chloride sprayed across the sludge at right angles to the flow. Control of the chemical dosage is obtained by propor-

FIG. 1—CROSS-SECTION of the Calumet sludge-disposal plant, showing the arrangement of equipment for drying and complete incineration. Waste vapors are passed through the 2500 deg. F. furnace heat for deodorization and then go to the dust precipitator before they are exhausted to the atmosphere.


Breeching to Cottrell (Not shown)
Induced draft fan
Fuel bin
Primary air fan
Auto damper
Waste vapor duct
Electrical equipment room
Ash hopper
Ash sluice
365°F.
225°F.
Vapor-heater
1000°F.
1400°F.
Burner
2,500°F. furnace
225°F.
Circulation fan
Feeder
1000°F.
Hot tower
Bar cage drying mill
225°F.
Separator
Surge tank
Breeching from Cottrell
Steel stack 116 ft. above roof
Dried sludge elevator to storage bin conveyor and fuel conveyors
Vacuum filter
Sludge storage bin
Conveyor scale
Pug mill sludge mixer
Mixed sludge elevator

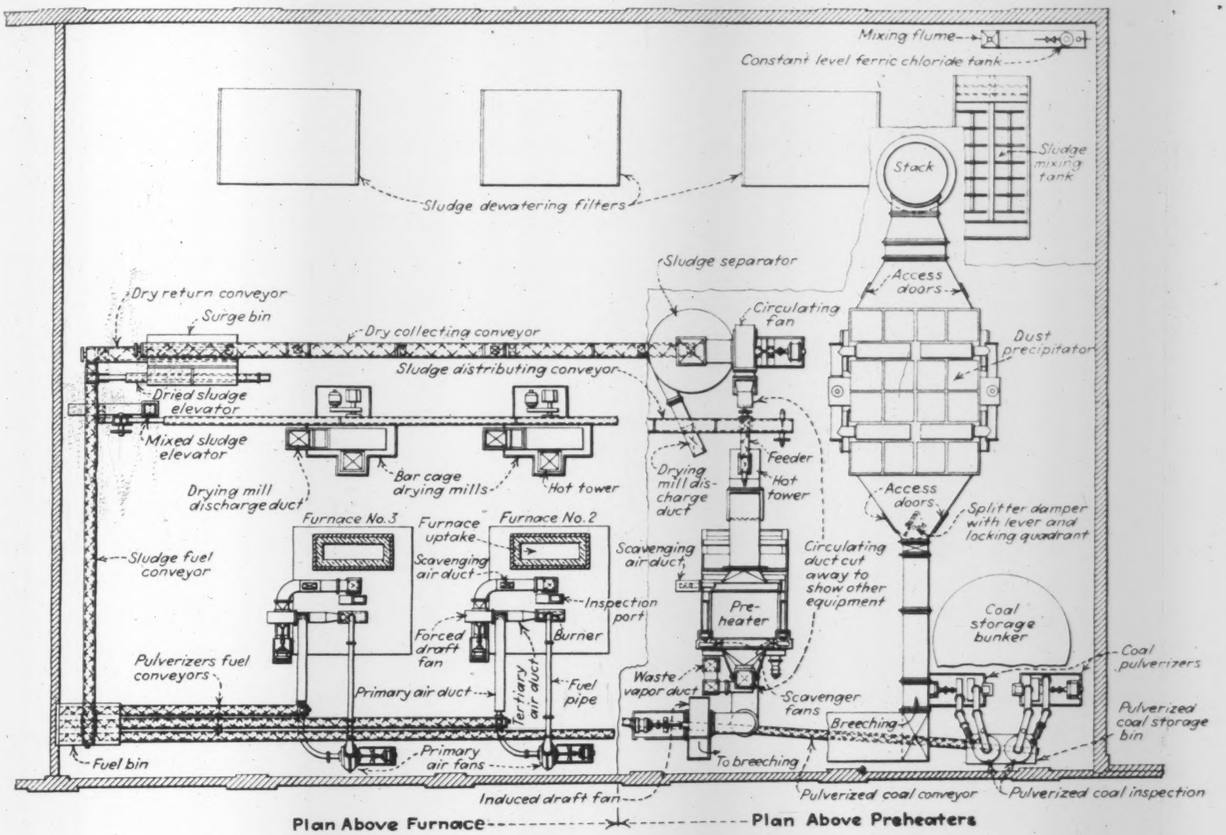

Mixing flume
Constant level ferric chloride tank
Sludge mixing tank
Stack
Sludge dewatering filters
Sludge separator
Circulating fan
Access doors
Dust precipitator
Dry return conveyor
Surge bin
Dry collecting conveyor
Sludge distributing conveyor
Dried sludge elevator
Mixed sludge elevator
Bar cage drying mills
Hot tower
Drying mill discharge duct
Drying mill discharge duct
Feeder
Hot tower
Access doors
Splitter damper with lever and locking quadrant
Furnace No. 3
Furnace uptake
Furnace No. 2
Scavenging air duct
Scavenging air duct
Circulating duct cut away to show other equipment
Sludge fuel conveyor
Inspection port
Pre-heater
Coal storage bunker
Forced draft fan
Burner
Coal pulverizers
Pulverizers fuel conveyors
Tertiary air duct
Fuel pipe
Waste vapor duct
Scavenger fans
Primary air duct
Pulverized coal storage bin
Breeching
Fuel bin
Primary air fans
To breeching
Induced draft fan
Pulverized coal conveyor
Pulverized coal inspection
Plan Above Furnace
Plan Above Preheaters

FIG. 2—COMPOSITE PLAN of the three sludge-drying and incinerator units, each of which may be independently operated. At the left is shown the layout of the plant above the furnaces, and the right-hand portion shows the arrangement above the vapor heater level.

tional-flow meters designed to maintain a predetermined constant ratio between the sludge and ferric chloride. This is accomplished by means of a venturi meter in the sludge line and an orifice meter in the ferric chloride line, both meters being connected through an electric automatic-flow ratio controller.

From the mixing flume the sludge flows by gravity to two conditioning tanks (Fig. 3) in which the ferric chloride solution and the sludge are mechanically agitated before the material is delivered by gravity to the vacuum filters. Each tank is designed to handle 167 gal. of sludge per minute at 98 per cent moisture with a 10-min. detention period. The period of time required for the sludge to flow through the conditioning tanks is controlled by the operator through adjustment of the discharge weirs. Mechanical agitation is provided by means of wood paddles mounted on a horizontal shaft extending longitudinally through the tank. Based on results obtained at the West Side experimental plant, the mixing paddles have been designed to operate at 5 r.p.m., or a paddle-tip speed of 63 ft. per minute. The conditioning tanks are of welded steel construction with the exception of the mixing paddles.

Three rotary vacuum filters, 11 ft. 6 in. in diameter and 16 ft. long, with 570 sq.ft. of effective filter area, have been installed for dewatering the conditioned sludge. Based on a filtering rate of 3 lb. of dry solids per square foot per hour, each machine will have an output capacity of approximately 20 tons of dry solids per day operating with a 97 per cent moisture sludge feed. Experience at the West Side plant indicated that this output can be obtained from a filter of standard design. However, at Calumet it is expected that with fresh activated sludge mixed with the raw solids and macerated screenings the feed will have a more filterable character than the sludge used in the West Side experiments. In these latter investigations it was also shown that the moisture content of the filter cake, for many conditions or types of sludge, depends upon the drainage of the filter itself.

The new filters are of the same diameter and length as the experimental machine used at the West Side, but in addition they are equipped with valves and vacuum connections at each end. This arrangement means approximately one-half the former area of filter cloth per valve and shorter drainage tubes, and therefore should give better drainage and a dryer cake.

The sludge-drying and incinerating plant consists of three independent units, each having its individual dryer, incinerating furnace, vapor heater and firing equipment. One complete flash dryer unit consists of a cage-mill sludge drier, dried sludge separator, circulating fan and vapor heater forming a completely closed vapor and dust-tight system. The individual drying units are designed and guaranteed to operate continuously at a capacity of not less than 6,500 lb. of water per hour, with drying vapor entering the hot tower at 1,000 deg. F. and leaving the separator at 225 deg. F. when fed with a mixed sludge containing from 40 to 50 per cent moisture. After passing through the dryer system, the sludge will contain not more than 10 per cent moisture.

After the dewatered cake leaves the filters at an approximate moisture content of 80 per cent, it is carried by means of belt conveyors over an automatic recording weighing machine to a pug-mill type mixer, where it is combined with a sufficient quantity of previously dried sludge to give a resultant mixture of 45 to 50 per cent moisture. The mixer is essentially two cut-flight screw conveyors running together in a combined housing. It is 11 ft. long, and the two 24-in. diameter screws are provided with adjustable pitch flights. This latter feature combined with a variable-speed drive makes it possible to obtain a wide range of mixing control. The material emanating from the mixer is dried sufficiently so that it can be handled easily without danger of packing into a solid doughy mass. In this condition it is brought to an elevating conveyor, where distribution of the mixed, partly dried sludge is made to screw feeders whose action causes a crumpling and tearing apart of material before discharge is made into vertical ducts, or hot towers, carrying heated vapor recirculated through the vapor heaters. In these towers the sludge particles travel along with, and are completely surrounded by, the hot drying vapors, and some evaporation of moisture takes place before the sludge enters the drying mills.

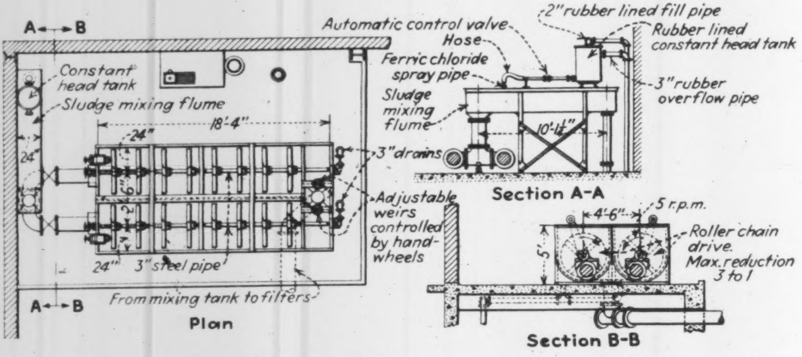


FIG. 3—CONDITIONING EQUIPMENT for the sludge prior to dewatering on vacuum filters includes a mixing flume where ferric chloride is added, and two agitating tanks provided with mechanically operated paddles.

Each drying mill consists of a substantial steel housing containing two sets of bar cages, one of which is stationary and fixed to the housing and the other rotated about a horizontal shaft by a motor drive. The rotating cage consists of three concentric cylindrical rows of bars. The stationary cage consists of two concentric cylindrical rows of bars interposed between the bars of the rotating cage. The entire assembly is enclosed in a removable, heavily insulated jacket, to increase its thermal efficiency.

The drying vapor carrying the sludge is fed into the center of two sets of cages, and as it finds its way through the alternate layers of stationary and moving bars the particles of sludge impinge against the bars and are broken into smaller pieces, thereby presenting a larger surface area to the hot drying vapors for the transfer of heat and the evaporation of moisture. The sludge-laden vapor is now conducted to cone-shaped separators where centrifugal action, induced by circulating fans, cause the sludge to be thrown out of suspension into the bottom of the separator and the vapor continues on through the circulating fans back to the vapor heaters. Provision has been made for the removal of the dried sludge from the plant prior to incineration for use as fertilizer if any demand should arise. In this case the B.t.u. content of all sludge so removed is made up by the use of additional coal in the furnaces.

When starting up the drying units the interior is filled with air, which serves as the initial medium for conveying heat from the furnace to the sludge to be dried. As drying continues, the water that is evaporated displaces the heated air, and the heat-transfer medium soon approaches one of vapor only. Since water vapor is continuously generated, a certain amount must be wasted after each cycle of drying. How this is accomplished becomes clear when the entire drying cycle of operation is reviewed. Vapor leaving the separator at 225 deg. F. goes to the circulating fans and thence to the vapor heater, where its temperature is raised to 1,000 deg. F. In this condition it is returned to the hot tower, where it passes over sludge containing 40 to 50 per cent moisture, enters a bar cage dryer and thence to the separator, where it delivers sludge containing approximately 10 per cent moisture. On its return to the vapor heaters, there are branch ducts provided with automatically controlled dampers which discharge the excess vapor and moisture to the furnaces for heat treatment, to destroy odors before passing it up the stack to the atmosphere.

The vapor heaters are of the regenerative continuous counterflow type designed for continuous duty at a temperature of 1,800 deg. F. Each heater consists, essentially, of a steel housing with an upper vapor passage and a lower gas passage with a drum rotor mounted on a horizontal shaft between the two, so arranged that the drum rotates through the gas and vapor streams. The drum rotor is divided into 24 sectors, each of which is packed with thin corrugated sheets of high-temperature steel in such a manner as to form thousands of small passages through the drum parallel to the shaft. Sealing strips are provided along the edges of the radial division plates between the sectors to prevent the flow of vapor or gas from one stream to the other. These heaters are provided with "scavenger sections" to prevent the escape of any vapor to the atmosphere without having first passed through the furnace for the destruction of odors.

Incineration and ash disposal

The dried sludge, together with any necessary coal, is incinerated in three flash-type furnaces in a pulverized form using high-velocity, vertical, powdered coal burners. The entire outside of each furnace unit is steel-encased and insulated, and the walls are of sectionally supported, air-cooled construction.

It is well to call attention at this point to the fact that incineration, drying and filtering operations are correlated functions, each of which depends upon the other. The amount of sludge filtered is, of course, the average amount of sludge coming into the plant in the sewage. The amount and temperature of the drying vapor circulated depend on that amount of sludge and its water content. In turn, the amount of fuel burned (or the magnitude of the heat release) in the furnace depends on the amount of heat required by the drying vapors.

Each unit was designed on the basis of a heat release of approximately 10,000 B.t.u. per cu.ft. per hour of active volume. While this is a conservative figure for pulverized fuel burning as compared with ordinary practice, the release has been purposely kept low to avoid troubles incident to the low fusion point of the ash. However, if the furnace is operated at a heat release of 15,000 B.t.u. per cu.ft. per hour, this would increase the disposal capacity of the furnace approximately 50 per cent and with the resultant higher furnace temperature there will still be little danger of ash fusion, which occurs at approximately 1,900 deg. F.

Products of combustion emanating from the furnaces are combined with the waste vapors from the drying system, and together they pass through the vapor and dissipate through the gas heater, where a transfer of heat is made to the drying cycle. From the vapor heaters the gases go through the induced draft fans into a common breeching and thence to the dust precipitator. The gases passing through the dust precipitator are forced to travel between high potential electrodes. Particles of dust in the gases are thus electrified, attracted and deposited on one set of electrodes, which are periodically vibrated to shake off the dust into a hopper below. The precipitator is a double unit so arranged that one-half may be used while the other is being cleaned or inspected. It is guaranteed to remove not less than 95 per cent of the entrained dust in the entering gases at its rated capacity of 54,000 cu.ft. of gas per minute. Exit gases from the precipitator go direct to the stack, where they are discharged to the atmosphere at about 350 deg. F.

The stack is of welded wrought-iron

construction, approximately 7 ft. in diameter and 116 ft. high above the filter-room roof on which it is supported. The top of the stack is 143 ft. above the furnace-room floor.

The ash-removal devices include both the hydraulic and dry vacuum types. Storage hoppers at the base of each furnace receive the ash deposits, which are periodically cleaned with a high-velocity water jet that sluices the ash into a cast-iron lined channel leading to a collecting sump. Fly ash from the dust precipitator is removed through vacuum conveyor tubes to this same sump, and from here all ash is discharged by special pumps to adjacent low land.

The Calumet sewage-treatment works extensions were designed and are being built under the direction of Philip Harrington, chief engineer; William H. Trinkaus and H. C. Ramey, assistant chief engineers; and Langdon Pearse, sanitary engineer. Others on the technical staff include L. C. Whittemore, engineer of treatment-plant design; F. W. Mohlman, chief chemist; H. I. Steffa and William A. Dundas, mechanical engineers; J. T. Hawley, electrical engineer; F. L. Finlayson, architect; and Ralph R. Leffler, structural engineer. The construction work is in charge of L. B. Barker, principal construction engineer of sewage works.

Concrete Mixing and Placing at Grand Coulee Dam

First of two duplicate mixing plants, each with a capacity of 320 cu.yd. per hour, has floor area of only 42 sq.ft., but total height exceeds 250 ft.

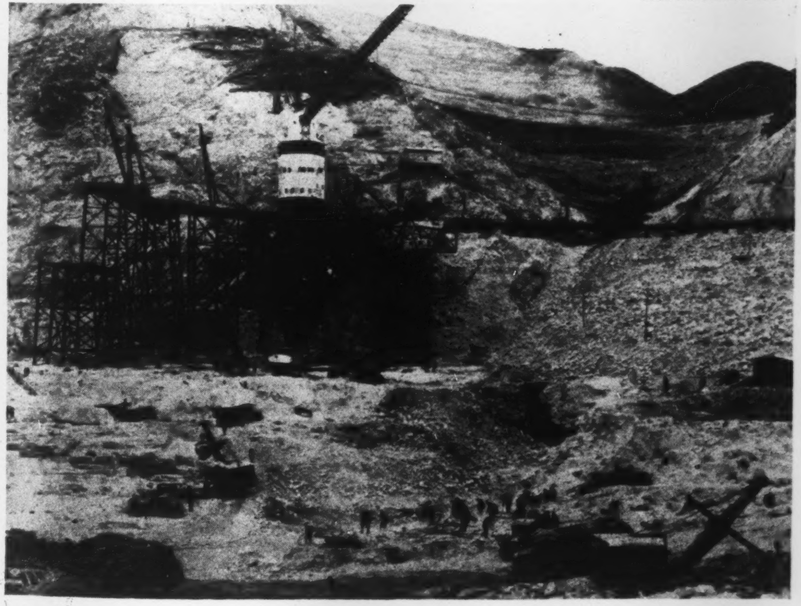
CONCRETE placed in Grand Coulee Dam under the present contract is to be mixed in two plants with duplicate equipment located on opposite sides of the Columbia River. The general program of constructing the dam involves unwatering of the westerly portion of the foundation first; hence the plant for mixing concrete for the west half of the dam was the first to be built. Designed for a capacity of 320 cu.yd. per hour, this plant has various novel features in layout, equipment and capacity, outlined in the following.

The west plant superstructure rests on reinforced-concrete supports built close against the west abutment of the dam. Steepness of the rock is such that although the ends of the 45-ft. floor beams rest on the rock on the uphill side, the columns supporting the other ends of these beams on the downhill side are 120 ft. long. These columns will be embedded in the concrete of the dam as pouring progresses. Cement is delivered by compressed air to the top of the plant through an 11-in. pipe. The aggregate, consisting of four sizes of gravel and a sand carefully blended from three size gradations, likewise enters near the top on a 36-in. conveyor belt that crosses the river to the plant via a suspension bridge 3,500 ft. long. This belt can bring in 700 tons, or about 500 cu.yd. per hour.

Cement is delivered to the job in bulk and is drawn out of boxcars on the railroad siding by pneumatic unloaders which deliver to any one of eight 5,000-bbl. steel silos. The brands are stored separately so that the exact quantities of each required in a given blend can be drawn from the individual storage silos to a screw conveyor that runs beneath the bins. This conveyor delivers to a bucket elevator discharging into either of two 5,000-bbl. silos reserved for storage of blended cement. As needed at the mixing plants, cement is drawn from blended storage and forced by air through an 11-in. pipe line 2,000 ft. to the west mixing plant, or later it will be delivered 6,200 ft. to the east plant. The trip to the east plant will be via the suspension bridge across the river. With the equipment as now set up, the 11-in. pipe has a capacity of about 600 bbl. of cement per hour. On leaving the delivery pipe at the west plant, cement is received in an expansion tank in which air and cement separate. A two-way valve at the bottom of this tank delivers to storage bins beneath.

FIG. 1—WEST CONCRETE-MIXING PLANT at Grand Coulee Dam as seen from cofferdam. Note high and low-level trestles under construction. Suspension bridge carrying belt conveyor is shown in top center. The skyline in the center background marks the edge of the large slide area.

McPherson Photo

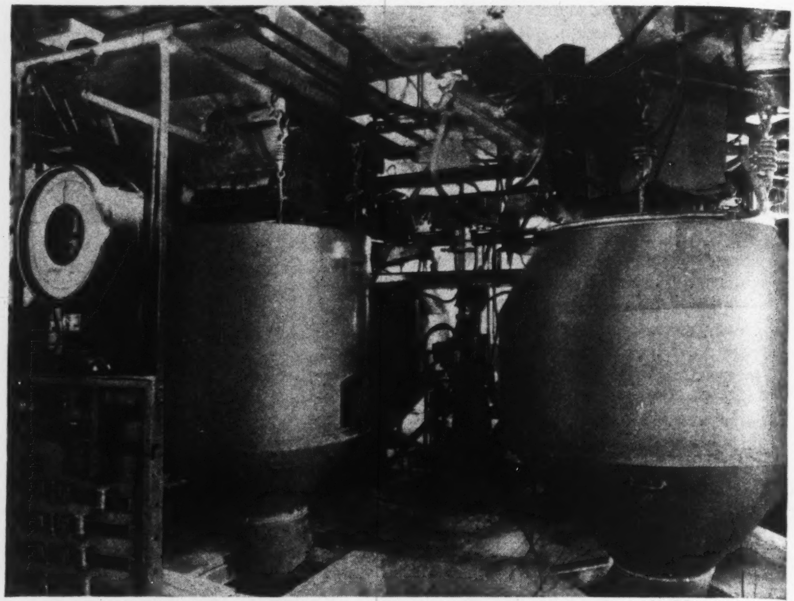


Concrete mixing and delivery

Materials arriving on the aggregate belt (the suspension bridge supporting this belt was described in *ENR*, Nov. 15, 1935, p. 675) are delivered into the octo-bin structure, which has space for 1,150 cu.yd. of aggregate and 1,350 bbl. of cement. Below these bins on the batching floor are batcher controls for automatic weighing. There are five possible combinations of the ingredients, and any one of five valve positions automatically sets the weighing devices (Fig. 3) for the right proportions of one combination. There are seven complete automatic weighing devices for materials, one for each of the four rock sizes, two for cement and one for sand. A separate batcher is provided for the water.

Below the batching floor a rotating spout serves each of the four 4-cu.yd. mixers successively. The mixing time is specified as 2½ min. and, allowing time for charging and discharging, a 45-sec. interval is to elapse between successive deliveries from the rotating spout. The mixers are of the type that charge and discharge from the same end; they tilt up into the charging (and mixing) position and downward for discharging. On this schedule a 4-cu.yd. batch of concrete is delivered every 45 sec., and each mixer completes a cycle of operations every 3 min.

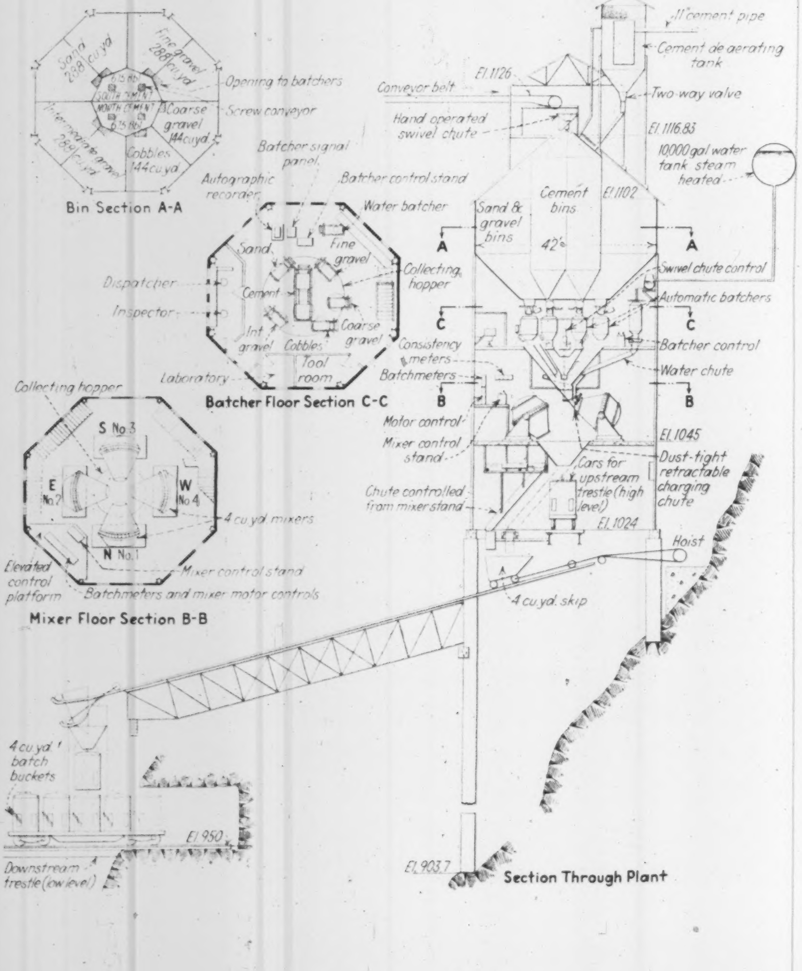
Delivery from the mixers is into a hopper from which the batch goes directly to a bucket spotted beneath the hopper on the high-trestle level, or it can be diverted through a chute to a car on an inclined track extending down to buckets on cars at the low-trestle level.



McPherson Photo

FIG. 3—THE BATCHER FLOOR and automatic-control equipment. The beam box at left weighs quantities for any one of the five mixes. In the center is the pneumatically operated mechanism for revolving the mixer charging chute.

FIG. 2—VERTICAL SECTION through west concrete-mixing plant. High and low-level delivery tracks are shown.


Sand 288 cu.yd
Fine gravel 288 cu.yd
615 Bbl
SOUTH CEMENT
NORTH CEMENT
615 Bbl
Coarse gravel 144 cu.yd.
Intermediate gravel 288 cu.yd
Cobbles 144 cu.yd
Opening to batchers
Screw conveyor
Bin Section A-A
Batcher signal panel
Autographic recorder
Batcher control stand
Water batcher
Sand
Fine gravel
Collecting hopper
Dispatcher
Cement
Inspector
Coarse gravel
Int. gravel
Cobbles
Tool room
Laboratory
Batcher Floor Section C-C
Collecting hopper
S No.3
E No.2
W No.4
N No.1
4 cu.yd. mixers
Elevated control platform
Mixer control stand
Batchmeters and mixer motor controls
Mixer Floor Section B-B
11" cement pipe
Cement de aerating tank
El. 1126
Conveyor belt
Two-way valve
Hand operated swivel chute
El. 1116.83
10,000 gal water tank steam heated
Cement bins
El. 1102
Sand & gravel bins
42'
A
A
Swivel chute control
Automatic batchers
C
C
Batcher control
Consistency meters
Batchmeters
Water chute
B
B
Motor control
Mixer control stand
El. 1045
Dust-tight retractable charging chute
Cars for upstream trestle (high level)
Chute controlled from mixer stand
El. 1024
Hoist
4 cu.yd. skip
4 cu.yd. batch buckets
El. 950
Downstream trestle (low level)
El. 903.7
Section Through Plant

There are only the two delivery levels: the high trestle at El. 1,024 (about 160 ft. high) near the upstream face of the dam, and the low trestle at El. 950 (about 85 ft. high) near the downstream toe. Each of these trestles (Fig. 1) is about 30 ft. wide; this is width enough for three standard-gage tracks and, outside of these, rails on which to support a gantry crane. The trestle bents are entirely of steel and will remain in the concrete, which is being poured around them. The first sections of these trestles in the west cofferdam are 1,300 ft. long. When the east and center cofferdams are built, these trestles will be extended entirely across the river to a total length of 3,000 ft. Concrete moves out onto the trestle in 4-cu.yd. buckets carried on flatcars. Each flatcar has space for five buckets and is hauled by a 10-ton diesel locomotive. Ten locomotives are on the job.

On being spotted beneath the gantry crane, an empty bucket is first deposited by the gantry in the space provided for it on the flatcar, and one of the four loaded buckets is picked up. Each bucket, except the last of the four, is returned to its place on the car after having been emptied. When the fourth full bucket is removed by the crane, the car has remaining upon it four empty buckets and is ready to move out immediately. The bucket in process of being emptied while a fresh car is being spotted is the empty to be placed on the next car before the first full bucket is removed. The flatcars are 36 ft. long and have standard railway trucks.

The first concrete was poured in the west cofferdam on Dec. 6. When the operations are at full speed, it is expected that the west mixing plant will deliver concrete at the rate of about 150,000 cu.yd. per month. Since the east mixing plant duplicates in every way the plant now delivering to the west cofferdam, it is expected that in the latter part of the job (when both plants are operating) the delivery will range up to 300,000 cu.yd. per month.

The general contract on the Grand Coulee Dam is held by the Mason-Walsh-Atkinson-Kier Co., of which H. L. Myer is general manager. The work is being done under the direction of the U. S. Bureau of Reclamation, of which R. F. Walter is chief engineer and F. A. Banks project engineer.

Bridge Railings Removable in Case of Floods

Rio Grande bridge, twice overtopped, is equipped with structural aluminum railings that are quickly and easily removable in contrast to old fixed railings that acted as a dam for current and drift

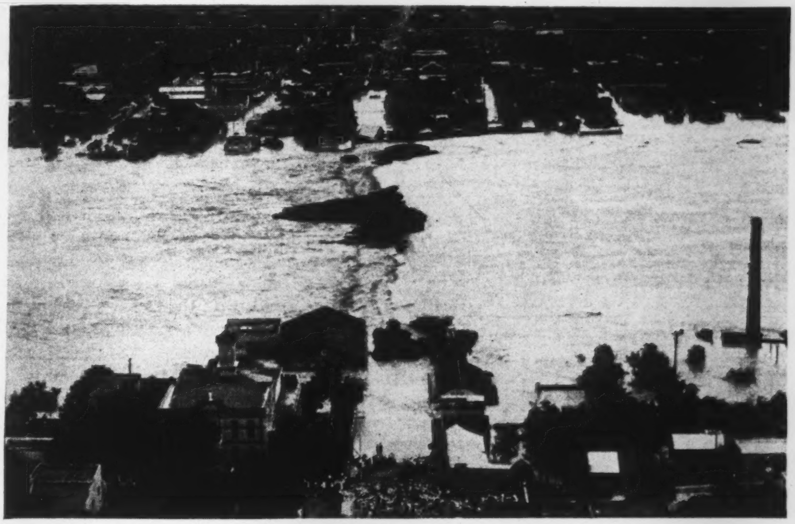
By J. W. Beretta
Consulting Engineer, San Antonio, Texas

REPAIR of flood damage to the international highway bridge over the Rio Grande between Laredo, Texas, and Nuevo Laredo, Tamaulipas, Mexico, has resulted in the unusual expedient of installing a railing that is easily detachable and thus may be removed on flood warnings, to eliminate an important obstruction to drift and current. Two past floods have overtopped this bridge, and observations augmented by hydraulic calculations indicated that the old railing, of heavy concrete construction, offered as much as 50 per cent of the total resistance of the structure to the current. In deciding upon a removable railing to improve this condition, the engineers set up the requirements that it be architecturally pleasing, economical, light, strong, simple and easily removable. After an exhaustive study of various types of railings and construction materials, it was found that structural aluminum successfully met all requirements, and this material was used for the reconstruction.

Originally constructed in 1922, the Laredo bridge is a reinforced-concrete structure consisting of five 150-ft. deck spandrel arch spans, flanked on the American end by a 61-ft. deck beam span and on the Mexican end by a similar span 50 ft. long. The roadway, 28 ft. wide, is flanked by two cantilever sidewalks, each $5\frac{1}{2}$ ft. wide, and was designed for a live load approximating H-20. The heaviest of all the highway bridges crossing the Rio Grande boundary, the Laredo bridge is a toll structure that is being operated under the terms of an ancient grant of a perpetual ferry franchise given to one Capitán Tomás Sanchez by the King of Spain at the time of the settlement of Laredo.

The flood that caused the most recent damage to the structure (*ENR*, Nov. 10, 1932, p. 557), greatly exceeded any previous Rio Grande flood on record and gave a new appreciation of the Spanish name of the river, "El Rio Bravo del Norte," or "The Wild River of the North." At the time of construction of the bridge the grade of the roadway was set 10 ft. above the highest previously recorded flood level of 33 ft. in 1919, but it was topped by a 45-ft. flood in 1922, which destroyed the Mexican abutment, and again by the record 54-ft. flood in 1932. That the bridge was able successfully to withstand total submergence, rapid current and battering of driftwood incident to these two floods, attests the adequacy of the design and the inherent ruggedness of this type of reinforced-concrete structure.

At the height of the 1932 flood, two spans of the Mexican end of a steel deck truss railroad bridge, about one-half mile upstream, were washed from their piers, floating down to act as battering rams against the highway bridge. Fortunately the level of the water was at a record height, and the battering was confined for the most part to the railings instead of to the main bridge structure. About 30 per cent of the original concrete railing was carried away by this debris, and there was additional damage caused by large trees and other driftwood. The railing that remained offered considerable resistance to the passage of the drift and debris, resulting in the formation of a large driftwood jam. As the flood ebbed, the drift settled on the roadway to a depth of over 10 ft. and a length of about 200 ft. Its removal required gangs of more than 100 men working nearly 24 hours, the work being complicated by a heavy matting of a bamboo reed plant that abounds in the upper reaches of the river.



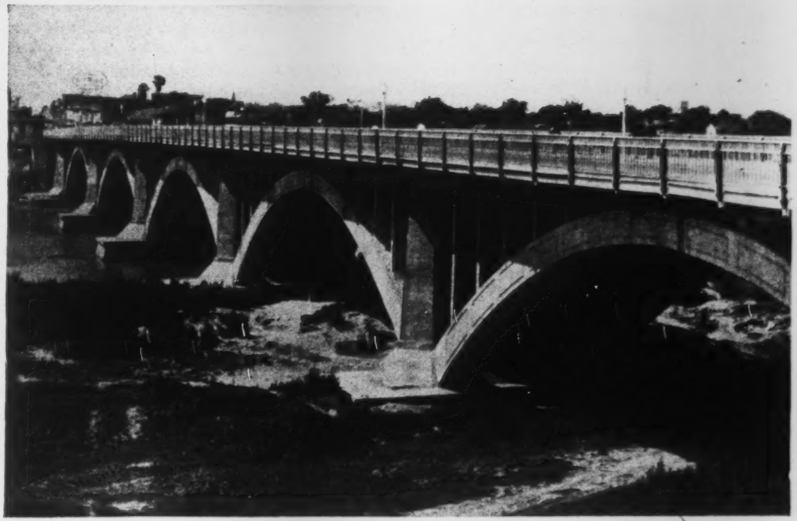


FIG. 1—LAREDO BRIDGE during and after the 1932 flood. Left: the bridge is still there, but its substantial fixed railing is holding a jam of driftwood, and two steel trusses from an upstream railroad bridge. Below: the bridge equipped with its new light removable railing of structural aluminum.

Immediately after the flood, engineering studies were made of the situation with a view to preventing recurrence of the damage. The fixed concrete railing was shown to have offered about 50 per cent of the total resistance of the structure to the passage of floodwater. The most obvious answer to the problem of eliminating this trouble was to replace the old railing with one that could be easily removed when excessive floods threatened. Removal of the railing should give the bridge a 50 per cent better chance of surviving future flood damage.

No precedent existing to serve as a guide, all thought in the design of the new railing was directed toward evolving a practical and economical removable railing. Simplicity and lightness of weight were the prime requisites; simplicity, because the operation of removal must be self-evident to unskilled men working without tools under emergency pressure; lightness because of the length of the bridge, the necessity for handling the sections by hand, and the distance from safe storage areas. Adequacy of design from the standpoints of strength, utility, architectural appearance and the lowest costs of installation and maintenance were also important governing factors.

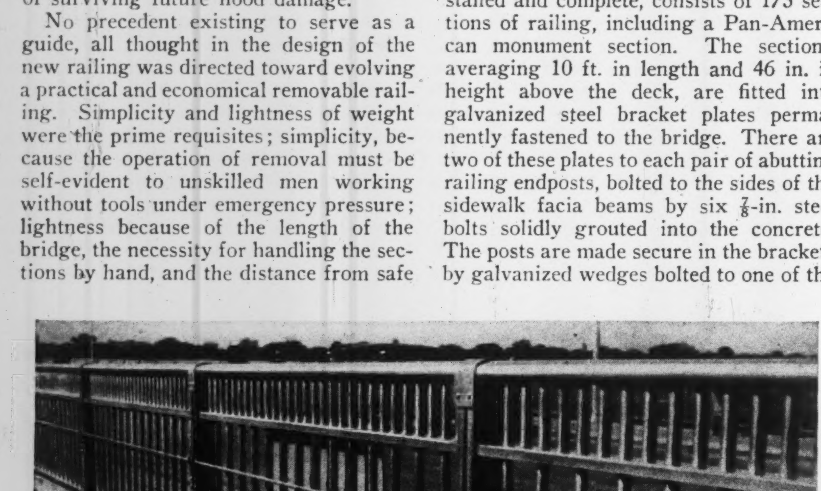


FIG. 2—RAILING SECTIONS attached to the sidewalk facia beams by steel brackets and wedges and given additional lateral strength by a ¾-in. cable anchored to a post at the end of the bridge. The strut brace is shown behind the railing at the right.

In the design studies, concrete, sectional steel-pipe railing, sectional structural-steel railing and combinations of pipe and structural steel hinged so as to lay over on the sidewalk deck during flood conditions were all considered and rejected as failing to meet one or more of the requirements. Two designs were finally accepted as feasible, and were completed for the purpose of ascertaining a cost comparison. The first design utilized welded steel pipe fabricated into removable 10-ft. sections, weighing about 300 lb. each. The second design utilized structural aluminum rolled and extruded sections, manufactured from an alloy known as 53ST and also fabricated into removable 10-ft. sections weighing about 94 lb. each. In the steel design a working stress of 18,000 lb. per sq.in. was used as against a working stress of 15,000 lb. per sq.in. for the aluminum. Cost estimates of the two designs revealed that they were about on a par as to first cost but that the aluminum design was considerably cheaper when maintenance and mobility were considered.

The accepted aluminum design, now installed and complete, consists of 173 sections of railing, including a Pan-American monument section. The sections, averaging 10 ft. in length and 46 in. in height above the deck, are fitted into galvanized steel bracket plates permanently fastened to the bridge. There are two of these plates to each pair of abutting railing endposts, bolted to the sides of the sidewalk facia beams by six ⅞-in. steel bolts solidly grouted into the concrete. The posts are made secure in the brackets by galvanized wedges bolted to one of the abutting railing endposts through slotted holes to facilitate adjustment and to prevent loss of the wedges when the railing is removed. Since aluminum has about twice the coefficient of expansion of concrete, ½-in. clearance is provided between all abutting railing endposts. By placing the railing at the side of the facia beams rather than on the sidewalk deck, like the original concrete railing, each sidewalk is widened 14 in.

An extruded oval tube 5 in. wide, with ⅛-in. walls, forms the top section of the railings. The endposts are 5-in., 2.38-lb. rolled channels. An intermediate longitudinal 4-in. extruded channel is located about 8 in. below the top rail for improved architectural appearance, while a 4-in., 1.90-lb. rolled channel is utilized as the bottom longitudinal member. The intermediate vertical members are 1½-in. extruded tubes with walls 1/16-in. thick extending from the bottom channel to the top oval rail. Alternating short sections of tubes are added between the top oval rail and the intermediate longitudinal channel. Adjoining sections of railing are designed as alternate male and female sections, with the two ends of each section being the same. The female sections are provided with riveted coverplates at each end, which extend over the end of the male sections in the completed structure, giving an appearance of continuity which is heightened by false rivet heads.

The problem of fabrication and installation was somewhat complicated by the slight variations common to all concrete structures. It was necessary, therefore, to make very careful field measurements from which the working drawings for the various sections could be prepared and from which the bracket plates could be set. In order to line up the railings laterally, it was necessary to do some cutting and filling of the sidewalk facia beams. As a means of obtaining proper vertical alignment, small lug angles were fitted in the field to the endposts of all male sections; these lugs rested on the sidewalk and were attached to the railing by chromium-plated bolts. The portions of the endposts in contact with concrete at the sides of the facia beams were primed with one coat of red lead paint. In order to facilitate re-erection after removal, each railing section was match-marked in position with steel stamps, and copies of erection diagrams are carried in the permanent files of the company.

All aluminum material was shipped cut to length and marked for assembly into the proper sections at Laredo. The only fabrication done at the manufacturing plant was the riveting of the lug-angle connectors to the endposts for attachment of the longitudinal channels and the drilling of all holes in longitudinal members for insertion of vertical tubes. At Laredo all assembly was done by local labor under the direction of two skilled ironworkers; the cost of assembly was 17c. per foot of rail.

Assembly of aluminum railings on some previous installations utilized flue rollers of the type required for the installation of boiler tubes. On the Laredo project, however, use of this tool was discarded because it caused some cutting and consequent loss of section of the tubes. A satisfactory tool developed on the job worked on the principle of the prosser, which caused a swelling of the tube on both sides of the metal through which it passed. As a result of the use of this specially developed tool, it was unnecessary to weld the oval top rail to the endposts as originally contemplated. Connection of coverplates to the female sections and attachment of all longitudinal channels to vertical endposts were made by field-riveting with aluminum rivets.

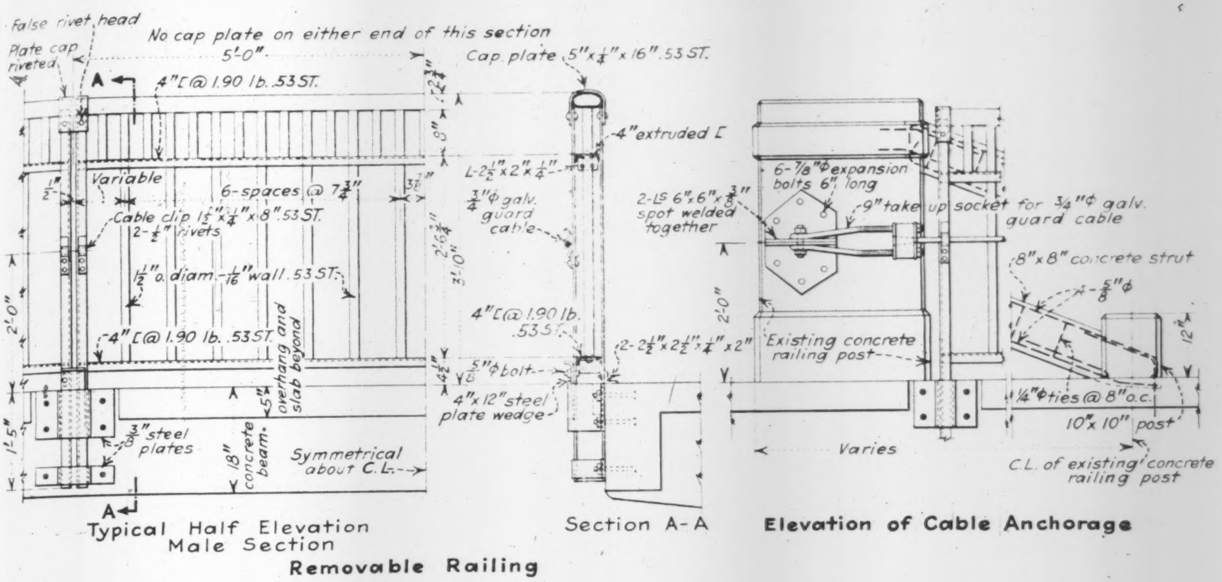

False rivet head
Plate cap riveted
No cap plate on either end of this section
5'-0"
A
4"[@ 1.90 lb. .53 ST.
Cap plate 5"x¼"x16" .53 ST.
2¼"
8"
4" extruded [
½"
Variable
6-spaces @ 7¾"
3½"
Cable clip 1½"x¼"x8" .53 ST.
2-½" rivets
L-2½"x2"x¼"
¾"φ galv. guard cable
1½" o. diam.-1/16" wall .53 ST.
2'-6¾"
3'-0"
2'-0"
4"[@ 1.90 lb. .53 ST.
4"[@ 1.90 lb. .53 ST.
overhang and slab beyond
5"
4½"
5/8"φ bolt
4"x12" steel plate wedge
2-2½"x2½"x¼"x2"
3/8" steel plates
18" concrete beam
Symmetrical about C.L.
1'-5"
A
6-7/8"φ expansion bolts 6" long
2-Ls 6"x6"x3/8" spot welded together
9" take up socket for ¾"φ galv. guard cable
8"x8" concrete strut
4-5/8"φ
12"
Existing concrete railing post
¼"φ ties @ 8" o.c.
10"x10" post
Varies
C.L. of existing concrete railing post
Typical Half Elevation Male Section
Section A-A
Elevation of Cable Anchorage
Removable Railing

FIG. 3—DETAILS of removable aluminum railing sections and of the cable anchorage at the end of the bridge.

Four large endposts of the original concrete railing, two at each end of the bridge, were left in place to provide anchorages for ¾-in. galvanized steel cables running the length of the bridge outside the railings and 2 ft. above the sidewalk. In order to reinforce these cable anchorages, concrete batter struts or kneebraces were doweled into both the sidewalk deck and the posts. The cables, supported at each aluminum endpost by means of clip plates, were tested to 32 tons breaking strength and are attached to take-up sockets, which are in turn attached to the concrete endposts by means of pins and anchorage plates bolted to the posts by means of grouted bolts. The primary purpose of these cables is to provide additional lateral strength against vehicles colliding with the railing, but they also serve to lock the railing sections in place and thus prevent their removal by unauthorized persons.

New lighting standards, also removable, have no physical connection with the railing, but as a matter of convenience and enhanced appearance they are located adjacent to the railing rather than at the curb line. Special galvanized steel baseplates with attached vertical assembly rods are provided so that the entire standard could be permanently assembled before erection. These plates are attached to the deck by four ¾-in. grouted bolts arranged so that removal of the entire lighting standard assembly can be effected by loosening the nuts. Lug connections at the sidewalk level permit easy and rapid breaking and reconnection of the electrical circuit. The entire conduit system is thoroughly waterproofed against submergence, and the various circuits are controlled from a master switch located beyond flood reach.

It was originally estimated that the complete removal and storage of railing sections, guard-cables and lighting standards would require the services of about ten men for something over five hours. In September, 1935, following warnings of possible severe flood conditions, it was decided to remove a portion of the installation, both as a test and as a precaution. Much to the satisfaction of the officials of the bridge company, the guard cables and all of the upstream and downstream railing sections on the Mexican half of the bridge were removed and safely stored in 45 min. by ten unskilled men using makeshift tools. These same men reinstalled the railings and cables in complete alignment in 1½ hours. As flood warnings allow from five to ten hours and sometimes longer, the entire installation is considered a complete success.

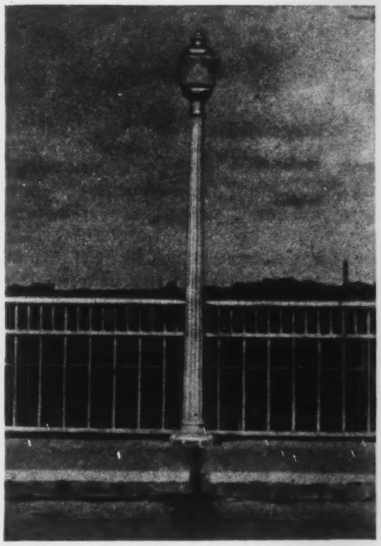


FIG. 4—LIGHTING STANDARDS, removable like the railing, are placed over each pier.

The climate of the Laredo section also accented another excellent feature of the installation. After erection was complete in April, 1935, the railings were cleaned and polished to smooth metallic brightness with steel wool. Due to the dryness and purity of the atmosphere and the total lack of industrial gases and other deleterious agents, the metal has lost but little of its luster up to the present date. Maintenance is simplified because of the fact that the slow oxidation of the aluminum will provide all of the necessary protection, and no painting was used or will be required in the future.

Due to the peculiar conditions in connection with the work, no general contract was let, and all work, with the exception of electric wiring, was done by bridge company forces. The total cost of the railing and lighting installation was $19,235.31, including engineering and supervision. This figure includes the cost of extensive repairs to the concrete cantilever sidewalks and the necessary filling and cutting of the concrete, to obtain alignment of the railing, which comprised a large percentage of the total figure.

The entire project was designed and supervised for the Laredo Bridge Co., owners, by J. W. Beretta Engineers, Inc., San Antonio, Texas, who were given invaluable technical assistance in the design by J. P. Growdon, of the Aluminum Company of America.

The superintendent of construction was D. R. Parsons. The engineer and supervisor, representing the consultants, was H. F. Stubbs, to whom is due great credit for the development of fabrication and construction procedure and the handling of a unique project.

Current Notes on Sewage Disposal

An analytical summary of recent developments for the engineer, research worker and plant operator

MILK WASTE TREATMENT

An adequate method for treatment of milk waste is indicated by the experiments conducted at the Rothamsted Experiment Station in England (Report of Water Poll. Res. Bd., 1935). Mixtures containing 1 per cent of milk by volume were fermented for 24 hours, and the material was then subjected to biological treatment on trickling filters. When applying the fermented material at a rate of 100 gal. per day per cu.yd. (filtering material was gravel), an active biological film was rapidly formed during the first few days and, after about two weeks' operation, oxidation was stabilized. The effluent produced was bright, containing nitrates and having a biochemical oxygen demand of only 20 p.p.m. against an original B.O.D. of 700-900 p.p.m. for the fermented liquids and 1,200-1,300 p.p.m. for the mixtures. Thus with the combination of the two processes of fermentation and trickling filter treatment, a purification of about 98 per cent was obtained. Of further interest are the findings that fermentation at 86 deg. F. was better than that at ordinary temperature, and that rigid exclusion of air caused no acceleration of decomposition.

* * *

TRICKLING FILTERS NEED PHOSPHORUS

The question of why trickling filters perform poorly when treating sewage containing sugars and similar compounds (such as beet sugar wastes) is partly explained by investigations reported by Jenkins (*Biochem. Journal*, Vol. 29, 1935, p. 1116). His experiments demonstrate that in biochemical oxidation of carbohydrates and of organic matter present in the press water of beet sugar factories, certain amounts of phosphorus must be present in a form available for micro-organisms. It was also shown that the influence of phosphorus on the rate of oxidation by a trickling filter is dependent on several factors. The most important of these were: size and type of filtering material, amount and nature of the phosphorus compounds present and the nature of the nitrogen compounds present. The filter medium—stone gravel, clinker, etc. —should be coarse enough to prevent clogging. The use of potassium hydrogen phosphate was found to be much more stimulating in its action than the organic phosphorus compounds present in the waste.

* * *

VALUE OF FLEXIBLE AERATION UNITS

The value of constructing flexible aeration units in the activated-sludge process was demonstrated by Watson (*The Surveyor*, Vol. 88, 1935, p. 609) who, experimenting on a plant scale by treating 2.25 m.g.d. of sewage in surface aeration units, concludes that the rate of absorption of oxygen by activated sludge depends upon the strength of the liquid undergoing purification. With a plant treating sewage in a series of tanks, there would probably be a distinct advantage gained in the rate of purification of a strong liquid when the application of air at the beginning of operation is greater than at the end. It is possible that much better results could be obtained, especially when trade wastes are present, if tanks are operated in series rather than parallel.

* * *

GAS-HOUSE WASTES AND TRICKLING FILTERS

The presence of gas-house wastes in sewage is considered to be objectionable mainly because they give rise to intense discoloration, are harmful to fish, have a very high oxygen demand and cause taste and odor in drinking water. Key (*The Surveyor*, Dec. 6, 1935), experimenting with these wastes on several trickling filters, operated under identical conditions, varied the proportion of the gas-house waste admixture and compared the results with sewage containing no waste. He found that regular and continued mixing of the waste and sewage was essential and that sudden and irregular application is to be avoided. The filters adapted themselves to, and were capable of taking care of the poisonous thiocyanite in the gas-house wastes after one week's operation. Either a special type of organism was developed, capable of oxidizing thiocyanite or a gradual change was taking place in the organisms originally present, which enabled them to deal with this substance. While the admixture of waste and sewage may cause a greatly increased oxygen demand, the effect on the effluent was inconsequential. No general rule was laid down concerning filter loadings.

BACTERIAL GROWTH

Chlorination of sewage is frequently thought of as sterilization rather than more or less complete disinfection. In water practice it has been found that bacteria will multiply rapidly after chlorination. Recently Rudolfs and Gehm (*Sewage Works Journal*, Vol. 7, 1935, p. 991) have shown that bacterial removal (including B. coli) from sewage varies with the quantity of chlorine added, the time of contact and the character of the sewage. These reductions are followed by rapid increases in the numbers of organisms. The total bacteria and B. coli may increase from five to ten times within 24 hours after chlorination. With complete chlorination the time required is longer. These results tend to indicate that poor chlorination may be worse than none.

* * *

SLUDGE DIGESTION IN FINLAND

Experiences obtained by Granqvist (*Ges. Ing.*, 58, 1935) during one year of operation of a new sewage-treatment plant for Byholmen, near Helsingfors, where activated sludge and heated sludge digestion is practiced, are of interest. The author found that heating the tank contents to 110 deg. F. produced twice as much gas per cubic capacity as heating to 75-80 deg. F., but the extra cost of heating to the higher degree was so great in this climate that in practice the economic advantage was lost. The digestion tanks are insulated by a layer of cork on the bottom and sides, and by a layer of lead on the cover. A novel feature is the arrangement of the heating units, which can be removed from the tanks without interrupting their operation. Repair or observation for incrustation is thus made possible.

* * *

FACTORS AFFECTING SEDIMENTATION

For years engineers interested in the design of sedimentation basins have known by experience that Hazen's formulas are not always applicable. The problem is difficult, and it is therefore encouraging to note that renewed interest has been taken in developing a workable theory which endeavors to account for the many variable factors. Slade (*Proc.*, Am.Soc.C.E., Vol. 61, 1935) has developed some formulas that may be generalized. He found that the constants required fall into three groups: characteristics of sediment, characteristics of the settling basin, and those factors depending on both the type of sediment and the degree of agitation. Carpenter and Speiden (*Sewage Works Journal*, Vol. 7, 1935, p. 200) present two formulas based upon experimental studies which are claimed to be satisfactory for estimating the probable performance of sedimentation basins. If predictions can be made of how different kinds of suspended matters will settle under different tank conditions, then simple methods of control may be made available. The problem is of such wide scope that it has engaged the attention of research men in several universities.

* * *

PAPER-WASTE POLLUTION

Studies made by Vallin (*Proc.*, Inst. Fishery, No. 5, Stockholm) dealing with the effect of sulphite paper waste upon a variety of fish have shown that in waters with low alkalinity this waste could be traced for long distances. The fibers themselves have a relatively low oxygen demand. In this respect they are of little importance unless sludge banks are formed, but they give footholds to fungi. Sulphate paper waste was many times more toxic to fish than sulfite waste, and fish were killed even with a 2,000 dilution. The degree of poisoning was parallel to the depletion of oxygen. Of special importance is the announcement that the wastes destroyed microscopic animals upon which the fish fed. It had been assumed heretofore that fibers adhering to the gills of the fish suffocated them, but these experiments showed that only sick fish with much slime on the gills were affected. Direct poisoning from sulphates and destruction of food can therefore be considered the most potent factors affecting fish viability in paper-waste polluted water.

* * *

POLLUTION LOAD OF MILK WASTE

According to Parker (*The Surveyor*, Dec. 13, 1935) the polluting effect of washwater effluents from dairies and milk-products factories handling 10,000 gal. of milk a day is equivalent to that of domestic sewage from a population of 1,000 people. If whey is discharged directly into streams, the effect is most pronounced, since this waste is at least 100 times as polluting in character as an equal volume of domestic sewage. Among the methods proposed for disposing of these wastes, the most common is by means of trickling filters, sometimes especially constructed. Another method, where sufficient land is available, is settling followed by broad irrigation. Recent experience has shown that milk waste can also be handled by the activated-sludge process.

Steel and Concrete Construction Combined in Armory

In new structure in Minneapolis, drill shed is framed with three-hinged steel trusses, while balconies on either side are of concrete—Floors of two stories under balconies and of arena are of flat-slab type

By Walter H. Wheeler
Consulting Engineer, Minneapolis, Minn.

LOCATED in the business district of the city of Minneapolis, Minn., on a block of land 330 ft. square, the new building constructed by the Minnesota State Armory Building Commission represents an interesting combination of structural-steel and reinforced-concrete design. It is centered on the two main axes of the site and is 330 ft. long by 214 ft. wide overall. It consists of a drill hall 270 ft. long by 206 ft. wide and a headhouse or office building 60 ft. long by 206 ft. wide, which includes four stories and a basement; there is also a basement under the drill hall. The end wall and roof of the drill hall are of structural steel, the trusses being of the three-hinge type. A total of 750 tons of structural steel was required. The sides of the drill hall are of reinforced concrete and incorporate the balconies. The floors of the arena and also of the headhouse are of special flat-slab construction in which all column capitals and dropped panels are eliminated by using a structural-steel column-head assembly concreted into the slab.

Drill hall

Spread footings resting on firm sand and gravel support the walls and columns of the drill shed. Eight three-hinged steel arches spaced 30 ft. c. to c. support the drill-hall roof, the shoes of the trusses being supported at the first-floor level by reinforced-concrete columns set inside the basement wall. The interior columns in the next row are also of reinforced concrete and extend to the balcony above the drill-hall floor. The other interior columns which support the drill-hall floor are of steel. These basement columns are spaced 30 ft. c. to c. and are 14 in. square outside the fireproofing. The smooth ceiling obtained with the type of flat-slab design used is indicated in one of the accompanying illustrations. The flat ceiling allows maximum clearance for the army trucks and other motorized equipment that enter the basement from either side by ramps, and the wide column spacing is an aid in maneuvering and parking.

The drill-hall floor slab was poured in six sections. Each section was finished as poured and covered with burlap and sand for curing. Two weeks after the slab was finished, steel erection started, working from the slab, which was further protected by 2-in. planks laid over the sand. The main trusses were brought to the job in sections and riveted on the drill-hall floor. Half trusses were set in the shoes with the inner ends lapping, and the two ends were then raised by gin poles placed at the quarter-points until the pin could be inserted at the center. The subtrusses were erected by a stiff-leg derrick with a 120-ft. boom. The method used for erecting the trusses was provided for in the design. Expansion joints are placed between each two pairs of roof trusses. Alternate pairs of trusses have diagonal bracing.

The roof slab is of burned-clay-aggregate concrete poured on a 2-in. wood fiber insulating and acoustic board, while further insulation is furnished by a 1-in. wood fiber board placed under the roofing. The only connection between the roof and side walls of the building is through an articulated section of this roof slab that is freely supported on a steel angle at the wall.

Consideration was given to various types of roof construction, and the one used was selected primarily because of the saving in insurance costs that it permitted. The estimates indicated that the type of roof selected would cost about $4,000 more than a light-weight metal deck with equivalent insulating value. However, the concrete deck entitled the building to a fireproof rating so that the fire rate on the building as constructed is 7.3c. per $100 insurance, which is about one-third of the rate quoted for metal deck or precast slab construction. The wind-storm rate on the building as constructed is less than one-half the rate quoted with metal deck or precast slab construction. These rates are with 90 per cent co-insurance. The rates on the contents are also correspondingly reduced.

The concrete balconies

The side balconies of the drill hall are structurally separate from the steel roof framing and are of reinforced concrete supported on reinforced-concrete columns. The second floor under the balconies on each side is of concrete joist construction, pan system, while the third floor is a one-way solid slab supported on the concrete spandrels at the outside wall and suspended on steel hangers from the balcony at the inner edges. Two contraction joints are provided in each side balcony, and a contraction joint is in the concrete frame at the sides of the drill hall at each roof truss. These joints carry through the masonry walls and are concealed, so that small movements in the wall can take place without being visible.

There is also a balcony at the south end of the drill hall supported from concrete columns in the fire wall by reinforced-concrete brackets. This balcony is 13 ft. 8 in. wide.

Headhouse

The office building or headhouse also utilizes the flat ceiling concrete construction. Plywood panel forms supported on adjustable steel joists were used in pouring the slab. After the forms were removed, the concrete ceilings were rubbed lightly with carborundum to remove the fins and surface stains. The ceilings in the office building will not be painted.

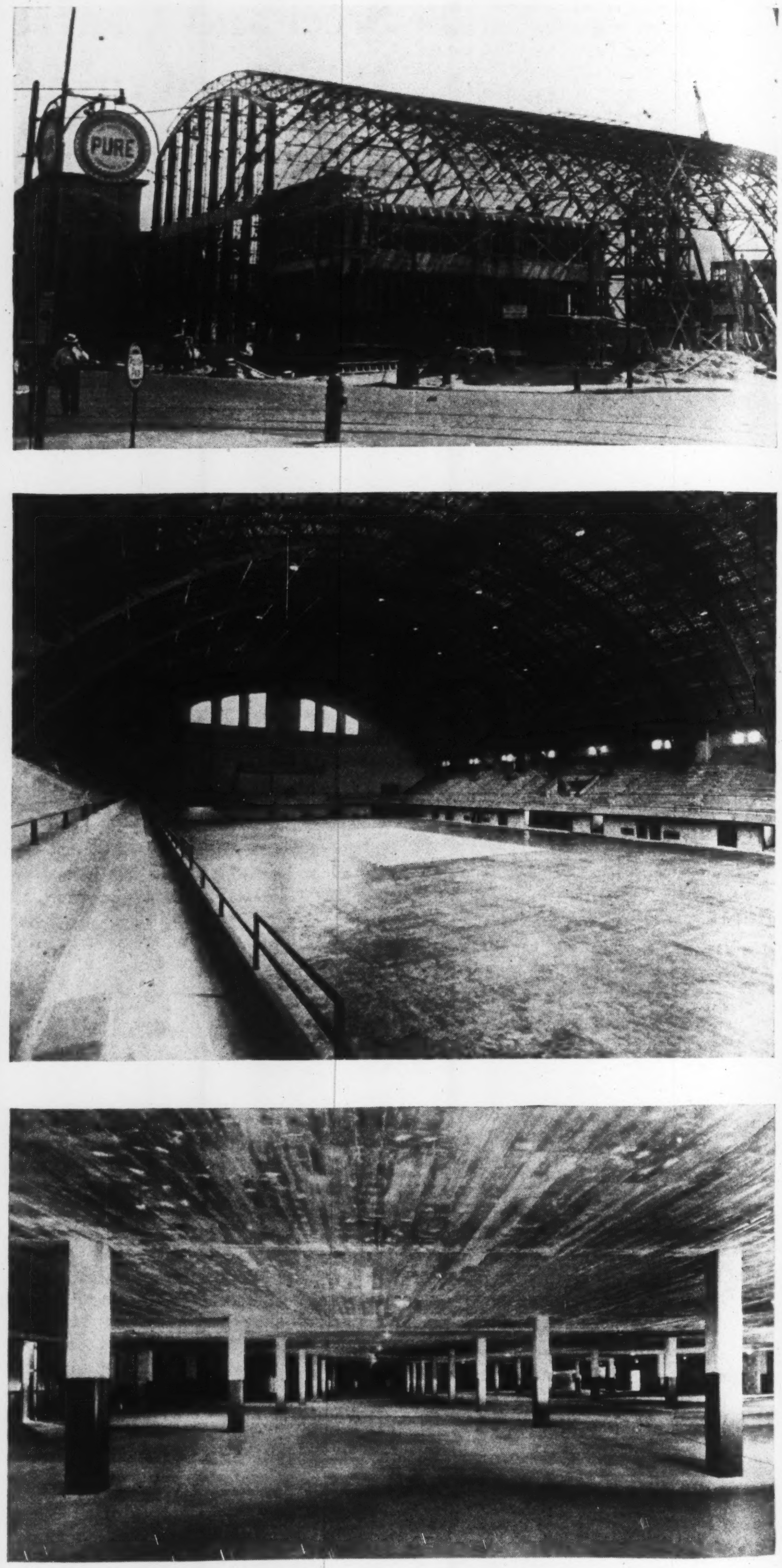
All column footings, wall footings and basement walls are of 2,000-lb. concrete. All reinforced-concrete columns, beams and slabs are of 2,500-lb. concrete, except the columns that carry the balcony brackets which, because of architectural reasons, are limited in thickness and thus require 3,000-lb. concrete and heavy reinforcement. Mechanical vibration was used in placing all concrete except the roof slab of the drill hall and the footings and slabs on the ground.

A wood floor is installed in the central area of the drill hall for indoor tennis, basketball and dancing. A depression was left in the top of the concrete slab to receive this floor. There is also a small ballroom and gymnasium on the third floor of the headhouse, which is spanned by steel beams at the roof.

Personnel

The total cost of the building, including architects' and engineers' fees, was $720,000. The building was financed by a private loan and a 30 per cent PWA grant. P. C. Bettenburg was the architect. The writer was consulting architect and engineer of the Minnesota State Armory Building Commission and also served as structural engineer.

The Paul Steenberg Construction Co. and C. H. Peterson & Co., Inc., were the general contractors. The steelwork was fabricated and erected by the Minneapolis Steel & Machinery Division of the Minneapolis Moline Co. F. L. Donnelly was superintendent of construction for the architect. W. L. Alban was resident engineer inspector, and Edward C. Dindorf assistant resident engineer inspector for the PWA.



STATE ARMORY BUILDING AT MINNEAPOLIS in various stages of completion, showing at the top the concrete balcony sections under construction on either side of the steel-frame drill hall. In the center are the drill-hall floor and balconies, and at the bottom is the basement under the drill hall featured by flat ceiling construction and wide column spacing.

Old Concrete Road Revamped for New Brick Surface

Renovating the profile and surface of an old concrete pavement for a brick surfacing of modern construction calls for real inventiveness in detailed field operations

By R. M. Andrew
Project Engineer, Indiana Highway Commission, Fortville, Ind.

COMMON PROCEDURE in paving is assumed to be so familiar that few writers consider it worthy of effort to tell of the puzzlements of decision and continuous procession of trial and error that parade through the hours and days of the field operations. The writer of the article that follows does the unusual thing—he recounts circumstantially these arriving details and determinations of the day's task as they come up for attention and are disposed of. It is more than a picture of routine that the article presents—a fundamental function of the "engineer on the work" is depicted in clear line and color. Incidentally the lesson is conveyed that these detail men have to be appraised and selected on standards that correspond with the vital duty that they perform.
—EDITOR.

BRICK RESURFACING between new concrete curbs of a worn concrete pavement on the road between Franklin and Greenwood, Ind. (U.S. 21), called for solutions of a number of interesting problems of procedure. The old road, built in 1921-22, was paved with an unreinforced-concrete slab 18 ft. wide and of 6:8:6-in. section without longitudinal or transverse joints. Being the principal road from Indianapolis to Louisville, on which a heavy traffic had developed, the pavement had become very rough. This condition presented substantial difficulties both in laying out a smooth and not too expensive new profile and in determining construction procedure.

The length of road to be renovated was 8½ miles, and the reconstruction planned was as follows: the new surface was to be 2½-in. vertical-fiber, beveled-end, lug-brick asphalt, filled with the excess filler removed from the surface. The cushion was to be a sand-asphalt mastic placed to a uniform thickness of 1 in., having an asphalt content of 3.4 to 3.9 per cent of cutback asphalt. Sand-cement grout was to be used to level the old slab, mixed in the proportions of 1:3 by volume (specified by volume, actually proportioned by weight) and placed to a minimum of ½-in. thickness. The retaining curbs were to be 12x12 in., and of plain concrete constructed according to pavement specifications.

Establishing profile

In determining the grade, profiles were taken of both edges and of the center of the old slab, with shots at all low or high points and not at any regular interval. These extra elevations were generally taken at all cracks in the old pavement, and the results showed that this was a satisfactory method. As the new crown did not correspond to the old (which was very irregular), the elevation used depended on the crown of the old slab at any point. The elevations were plotted to a scale of 1 mm., or 0.01 ft.; and where the existing crown was more than the new, the center elevation was plotted. Otherwise the highest edge was plotted.

The final grade was laid with pins and thread, control pins being set at stake locations and adjusted to give a proper cover of grout and a smooth-riding grade. An attempt was made to keep the grade breaking in a given direction for a minimum of 200 ft., but in a few cases this was reduced to 100 ft. to fit special conditions. Grade elevations were taken directly from the profile, with no attempt at computing a mathematical grade line.

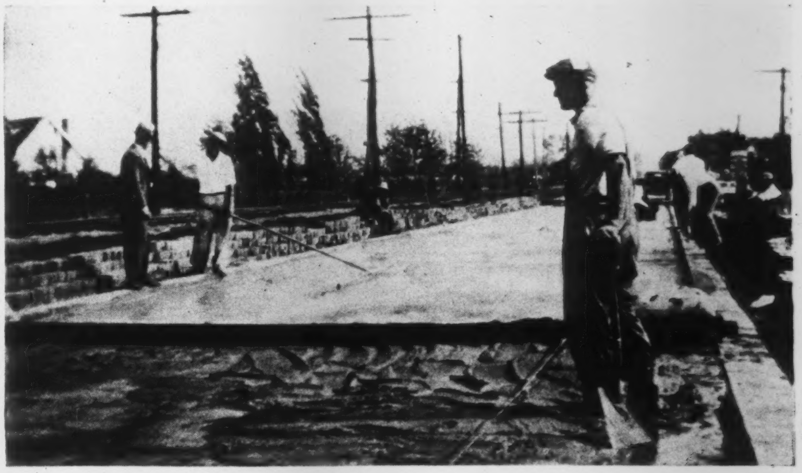


FIG. 1—LEVELING UP old road surface with cement-sand mortar shaped by a templet pulled behind the mixer.

The next step was to clean the old slab of excess crack filler that had accumulated over a period of years to an average thickness of well over ½ in. and in places to 1 in. Several special tools were tried, among them air spades and drags, but the most satisfactory results were obtained with a blade grader. This was supplemented by hand work near the edges of the slab, where a high edge caused the blade to ride over a narrow strip on each side. No apparent damage resulted from the use of the blade, but it is possible that an unskilled blade man might damage the edges and also cause spalling at the cracks.

Curb construction

Curb construction followed the cleaning of the slab, and excavation was entirely a blade-grader operation after first scarifying the grade, this being made necessary by metal shoulders along the slab. All other excavation was left until the surface was finished, except on relocations or other sections requiring a new base. The fine grading was a minor item and was all hand labor, being nothing more than dressing up the bottom of the trench.

The curb was concreted one side at a time for alternate day's pouring, the usual day's progress being 3,200 ft. at about 650 ft. an hour. The length of a day's run was determined by the amount of forms available and not by capacity, as pouring was done with a 27E paver and the rate given above was ample for a much longer stretch. The mixer was equipped with a closed-end chute which dropped the concrete into the forms with a minimum of crowding ahead and stress on the forms.

The forms used were one-piece or two-piece forms, 12 in. high for the outside, with a face form 3½ in. high, carried on the outside forms by angles that served as spacers and supports. It was found necessary to provide extra bracing for the form line, and knee-braces made of 2x4-in. lumber were set every 5 ft. These braces gave much better results than the form pins alone, but yet left much to be desired; it is probable that a wider base form should be used, one with not less than a 6-in. and possibly a wider base.

Considerable difficulty was experienced with concrete flowing under the face form. Due to the irregularity of the old slab, a 4-in. face form touched the slab in only a few places and a 3½-in. form not at all. Block fillers, burlap and adjustable steel liner plates were tried and abandoned, and the project ended with the problem unsolved.

Alignment for the curb was taken at 500-ft. intervals from the old slab with no consideration given to the surveyed center line. It was found advisable to increase the inside width to 18.2 ft. to prevent overhang on the old slab, and this resulted in improved alignment as well as a reduction of overhang.

During the construction of the curb, 2-in. pipe drains were placed at all pockets in the grade, and the expense involved was more than justified in the added ease of draining the base after rains.

Renovating old slab

Following curb construction, repairs were made to the old slab. The smaller breaks were repaired as curb was poured, the size limit being the point where curing of the patch would stop traffic completely on that section of the slab. Hand finishing was used on all patches, the surface being made to conform to the old slab with a minimum thickness of 6 in. in the patch. All obviously weak concrete was removed, as were all sections which though sound showed evidence of excessive rocking on the subgrade.

The next step in construction was to place the grout leveling course. The grout was mixed in a paver using a 9-bag batch of 1:3 proportions, and it was placed by a chute, the bucket having been abandoned because of excessive splashing and unsatisfactory placement. Prior to placing grout, the base was washed and swept and was sprinkled enough, immediately ahead of placing, to insure a damp surface without an excess of water.

The grout was struck off first with a heavy wood templet pulled by the mixer. On the early part of the work a two-ton tractor was used to pull the templet, but this interfered with both the mixer and the batch trucks and did not offer any advantage over pulling with the mixer. This heavy templet was followed by a lighter one, pulled by hand, and was used as many times as necessary to give the desired crown. Both templets were carried on long angles, to enable them to ride over the broom-finished curb and to take out minor irregularities.

The strike-offs were followed by checking with a 10-ft. straight-edge and floating with a very light float where necessary. A hand templet was used on the area adjacent to the curbs, as the large templets allowed considerable flow around the ends. Considerable difficulty was experienced in holding the proper crown and edge clearance, and constant attention was required on these features. The use of a burlap drag as a final step was abandoned quite early, as this dragged out the crown very badly.

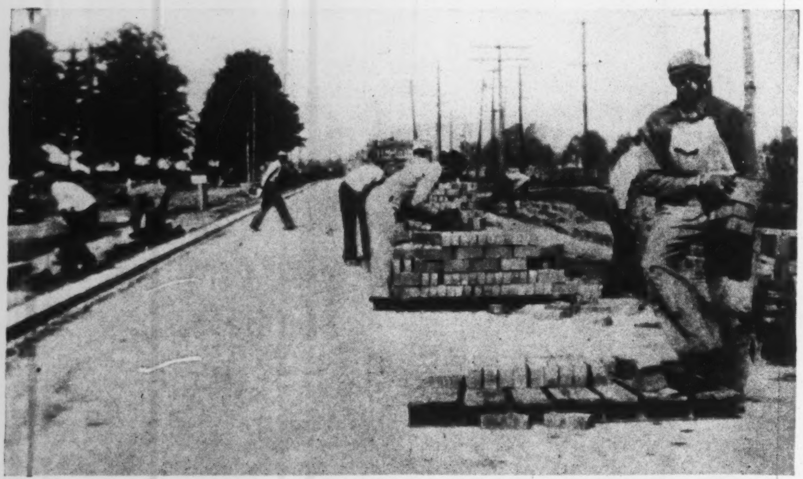


FIG. 2—PALLETS holding 1,500 bricks are unloaded from trucks, and the bricks are stacked by hand along edges of the pavement.

The grout was cured for three days by ponding except on the steeper grades, where wet burlap was used. Burlap was used on all the surface during the pouring and was removed at night as the ponds were built. The curing period was three days, after which the ponds were removed and the surface was allowed to dry.

Cushion construction

As soon as grouting had reached the first side road, brick laying started. The mastic plant was set up on the Pennsylvania Railroad, as the traction line could not handle the asphalt cars on their present tracks. The sand was fed by bucket conveyor to the dryer and then conveyed to a storage bin above the mixer, where it was fed by gravity into a measuring hopper and thence into the mixer. Asphalt was pumped from the tank cars to the measuring tank or the storage tank through a circulating line. The dryer was heated by oil burners and was a portable outfit. Mixing was done in an ordinary paver, stripped of skip and boom and set on an elevated platform to discharge directly into the trucks. The asphalt was heated by steam and kept at about 135 deg. F. The sand was heated to about 180 deg. in drying, and the resulting mastic had a temperature of 150 to 160 deg. when delivered on the job. Temperatures below this gave a mastic that worked very poorly and failed to give satisfactory results because it pulled under templets and straight-edges and was too tough to dress up with a straight-edge.

The mastic was spread as far as practicable as it was dumped from the trucks, a small pile first being dumped to fill the templets, which were emptied on each pull to prevent cooling and compacting.

Two box templets were used in tandem, pulled by a light tractor. The mastic was distributed by hand to an approximate cross-section, after which it was struck off by the templets. It was found advisable to follow the box templets with a light strike-off in order to fill places where compaction had caused pulling. A light surplus of material was kept in front of this templet, and an attempt was made to place the material where needed ahead of the strike-off, rather than drag it into place.

Placing was followed by checking with straight-edge and correcting surface irregularities. The edges along the curb were trued up with a hand templet. Best results were obtained where the shortest time elapsed between placing and finishing, a slight delay causing a disproportionate amount of trouble. On the first mile the cushion was rolled after checking and then rechecked for irregularities, with the exception of about 300 ft. on which the cushion was not rolled. On the remainder of the work the first mile laid was rolled, and then it was decided to leave out the rolling. The results in the finished surface and the ease with which bumps were removed seemed to indicate that this method was the more desirable of the two. Penetration of the brick into the rolled cushion was so slight that the brick could in many cases be moved on the cushion. When the cushion was not rolled the penetration was more pronounced; the cushion coming up between the brick for an average of ¼ in. provided a firm bedding for the brick. There was of course some reduction in the amount of fill used in this latter case.

Cushion laying started about one hour before brick laying each day and generally finished about ½ hour earlier than the laying. The speed of cushion work was governed by the output of

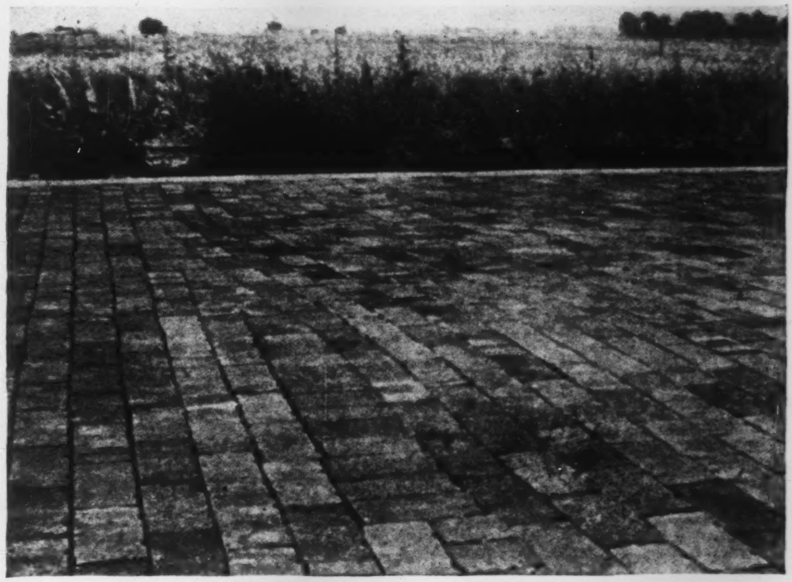


FIG. 3—FINISHED SURFACE, showing results of mixing bricks from different parts of kiln and laying courses tight.

the sand dryer and the mixer, and with a larger plant it could have gone much faster. The results obtained while the cushion was worked this far ahead (100 to 150 ft.) were satisfactory, but when a longer lead was taken than 150 ft., the surface did not roll as well or have as good riding qualities. Laying was carried up to about 10 ft. from the end of the cushion each day to allow checking the cushion joint to start the succeeding day's work.

In a few instances, rain stopped the work with cushion out ahead of the brick setting. This was covered with tarpaulins, and a shovel width of material was taken out along each curb for drainage. The cushion suffered no apparent detriment from being wet, and a sample taken ten months later from a piece that was under water for two days appeared no different from other samples of the same age and had the same asphalt content as was found in the samples that remained dry.

Brick laying

The bricks were transported by truck and hacked along each shoulder, the length of haul averaging 25 miles from the brick plants. One plant hauled on ordinary flat trucks, while the other used a special truck and trailer carrying three bins of 1,500 bricks each, or 4,500 on a trip. This truck was equipped with a hoist to lower the bins and tip them onto the end gate, a wooden pallet; upon removing the bin, the bricks were left stacked for hacking by hand.

Every effort was made to keep the bricks of one size coming together. One plant cooperated to the extent of gauging brick frequently as they came from the kilns and holding the variation within $\frac{1}{8}$ in., that is, from $3\frac{7}{8}$ to 4 in., and from 4 to $4\frac{1}{8}$ in. The other plant sorted solely by eye, which, with all due respect to men who have spent a lifetime in kilns, is neither satisfactory nor scientific. The results of mixing may be seen in one of the illustrations. This resulted from unloading bricks from one part of the kiln on one side of the road and from another part on the other side. The only satisfactory solution for this condition is to have the carriers cross frequently, so as to mix the two sizes and secure fairly uniform rows.

All handling of bricks from the hacks to the setters was by hand, using clamps which held five bricks on edge. The usual number of carriers was ten, five on each side, working to the middle.

At the beginning of the work two setters were used, one starting about 100 ft. ahead of the other and laying individual stretches of pavement. This required that the cushion be kept 200 ft. ahead of the second setter and also required stretching or squeezing of courses where one setter reached the starting course of the other. This method in general was not satisfactory, particularly in cold weather when the cushion was set up too hard for the removal of bumps without excessive delay. After a half-mile trial this method was abandoned in favor of two setters working together—that is, one setter started his rows, and when he was 4 or 5 ft. out, the second started, and later the third. Three setters are as many as can be economically worked on an 18-ft. pavement, as the carriers interfere with one another and cannot keep the brick supplied to the setters. The same number of carriers can supply three setters as well as two, even in the hottest weather; with two setters, there is a rush at the start of the course and a slackening as the setter moves across.

The carriers set the brick five high and flat, in the manner they were to be laid, and the setters dropped with both hands instead of handling each brick from hand to hand as is sometimes done.

Setting was followed by the first inspection and culling, and all defective bricks were replaced before rolling to insure uniform embedment. Inspection in this case meant a visual inspection of every brick, and the various defects were marked with different symbols. Following culling, the rolling was done—first from each curb to the center, then one diagonal, then the other diagonal, with a final rolling from curb to curb. After rolling, the surface was then checked with a steel straight-edge, made from two pieces of longitudinal joint steel welded together, and all irregularities were removed showing more than $\frac{1}{8}$ in. low at the center or $\frac{1}{8}$ in. high under one end. The specifications allowed an irregularity of $\frac{1}{4}$ in., but the contractor requested that all variations over the limits first mentioned be removed. The surface as laid was such, however, that two men handled the straight-edge work with some time for other work in all but a few instances.

Also following the rolling was a second inspection of the brick. Generally this showed only chipped brick and a few broken ones, but at times the two inspections required the services of five inspectors in order not to delay the work. It is probable that this expense could have been reduced by more arbitrary standards for passing shipments, but it is doubtful that the saving would have justified the loss to the brick manufacturers.

Joint filling

As soon as the final culling was done, the filler gang was allowed to proceed on the section. These sections were from 75 to 100 ft. in length, depending on culling and laying speed.

The separating agent was first applied (in this case, a calcium chloride solution) and sprayed until the surface was visibly moist but not wet enough to cause any solution to flow down the sides of the brick. Due to a few bricks known locally as "soft," it was necessary to have a workman whitewash some of the brick to insure a clean surface. These so-called soft bricks generally rattled 1 to 2 per cent above the remainder, passed soundness and absorption tests, and yet would soak up the calcium chloride solution fast enough to cause the filler to stick on them. Enough spray to saturate them would cause side wetting on the harder bricks, with consequent pulling of the filler from the joints, and the only satisfactory treatment was to have a man whitewash them with a hand brush. The soft bricks were easily visible, and the

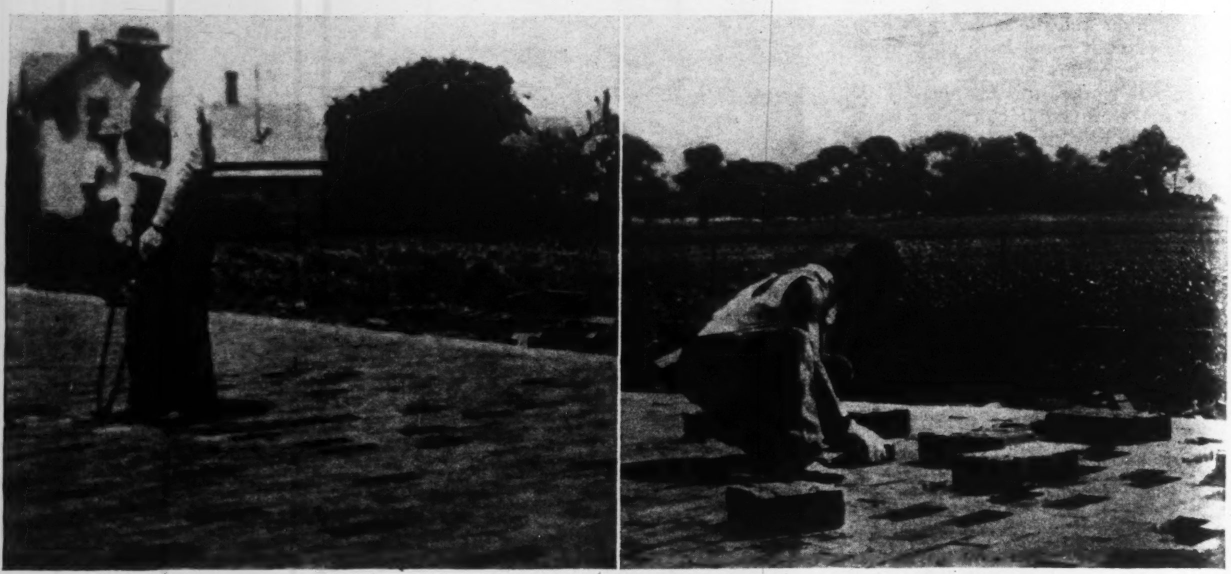


FIG. 4—CULLING defective bricks and replacing them with perfect bricks after laying and again after rolling.

painting was very satisfactory in securing separation.

The filler was heated behind the filling operation and was carried and poured by hand, the carriers using coal buckets. It was not found desirable to carry the kettles ahead of the operation, as the waste from the fires invariably blew off the ash onto the surface.

The distance of the carry was 75 to 100 ft., but in hotter weather this increased considerably, leading to the adoption of cold-water sprays to cool the filler. This spray was kept behind the pouring enough to allow the cracks to fill before cooling the filler, and the spray was kept to a minimum to prevent foaming in the kettles from excess water in the cut-off asphalt. Where the paver pipe line was yet in place, a hose spray was used, but in other places ordinary orchard spray tanks were used with results equal to hose applications.

Removal of excess filler was done with snow scrapers, strengthened to stand the harder service required of them. This modification consisted mainly of a brace from the handle to each end of the blade and the placing of a shovel grip on the end of the handles to facilitate using. As the filler was cut it was rolled ahead for the length of the cut and then loaded into wheelbarrows; leaving the rolls on the pavement causes sticking to the surface and pulling of the filler in the joints. The cut-off filler was mixed in the kettles with new material in about equal proportions; this procedure was not covered by specification but was defined by experience.

It was found desirable to sand the finished surface lightly immediately after the removal of the excess filler. This was done by hand-spreading and sweeping ahead, and prevented tracking of the surface by the workmen or the equipment that was moved behind the kettles. As an alternative method, flushing the surface with an open hose was tried, but the results were unsatisfactory and possibly more expensive.

The finished surface has been quite satisfactory. The appearance is very pleasing, the white curbs offering a contrast to the darker brick surface and acting, possibly too much, as a traffic guide. The riding qualities compare favorably with any other type of surface, and the non-skid wire-cut surface offers good traction in wet or dry weather. As yet, extruding filler has not marred the surface to any great extent, although this may occur during the second spring and summer if it is not worn off by the heavy traffic.

This is the first project of the newer-type brick surface which the writer has constructed, and the cooperation of the contractor and the Paving Brick Association aided greatly in overcoming the unforeseen circumstances. The contractor was J. C. O'Connor & Sons, of Fort Wayne, Ind., with J. R. Miller as superintendent. The state representatives were F. A. Henning, district engineer, Eugene Berkey, supervising engineer, with the writer as project engineer.

Public Control of Land Use Proposed in Planning Reports

THE TIME has come when land use can no longer be considered as a strictly private affair, according to a report by the New Mexico State Planning Board. This opinion is also held by the Idaho, Montana, Minnesota and Wisconsin boards, which have concluded that state cooperative grazing laws and rural land zoning are desirable and necessary. It is further stated by the New Mexico board that no one has the right to abuse his land so that neighboring areas are damaged by floods or drifting sand and soil.

Reports from various state boards to the National Resources Committee indicate that farming practices may be greatly altered during the next ten years. Studies show a steady abandonment of farm lands and transfer of operations to more fertile soil. Both New York and Pennsylvania report abandonment of over 100,000 acres per year during the past 30 or more years.

The state planning boards in 45 states have made extensive preliminary surveys of land use and have prepared maps showing areas now in crops and proposed crop areas that would figure in land-use programs. Further studies concerning soil quality, crops, agricultural methods, irrigation, drainage, reclamation and forestation have been started. The reports reveal varying points of view on readjusting farming practices. In some states it was felt that the type of farming could be changed to fit the acreage, while other states recommended the increasing or decreasing of holdings and agreements made with individual farmers to meet conditions on their properties. The Idaho state board believes that consideration should be given to a cooperative grazing law, and the Minnesota board regards rural zoning as a desirable means for directing land use in accordance with its suitability.

Civil Engineers' Meeting Centers on Technical Advance

Progress made in sanitary engineering, in construction equipment and in use of alloys reviewed—Economics division reports on proper methods of handling public works

THE GENERAL UPTURN in business was reflected both in attendance at the annual meeting of the American Society of Civil Engineers and in the report of society membership and finances as presented by George T. Seabury, secretary of the society, at the opening meeting held on Jan. 15 at New York. Membership at the end of the year was up to 15,069, and while this is not an all-time high, it shows a definite improvement over recent years. Applications for membership and for reinstatement rose sharply during the year, and the number of members dropped for non-payment of dues fell off sharply.

Honorary members

Honorary membership was conferred upon four members of the society in a ceremony held as part of the opening session. The recipients were John W. Alvord, consulting engineer, Chicago; John F. Coleman, past president of the society and consulting engineer, New Orleans; Mortimer E. Cooley, dean emeritus, College of Engineering and Architecture, University of Michigan; and William J. Wilgus, consulting engineer, Ascutney, Vt. As neither Mr. Alvord nor Dean Cooley were able to be present, Mr. Alvord was represented at the meeting by his partner of many years' standing, Charles B. Burdick, and Dean Cooley was represented by his son, Capt. Hollis M. Cooley.

Medals and prizes

Award of the society's medals and prizes followed the conferring of honorary memberships. The Norman Medal was awarded posthumously to the late D. C. Henny for his paper on the stability of straight concrete gravity dams; the J. James R. Croes Medal was awarded to A. T. Larned and W. S. Merrill for their paper on actual deflections and temperatures in a trial-load arch dam; the Thomas Fitch Rowland Prize was awarded to W. H. Kirkbride for his paper on the Martinez-Benicia bridge; the James Laurie Prize was awarded to Wilson T. Ballard for his paper on the three-span continuous-truss railroad bridge at Cincinnati, Ohio; the Arthur M. Wellington Prize, established by *Engineering News-Record*, was awarded to Hawley S. Simpson for his paper on the use and capacity of city streets; the Collingwood Prize for Juniors went to C. Maxwell Stanley for a paper on the study of stilling-basin design. Four awards of the Rudolph Hering Medal were made to the four authors of a paper on the intercepting sewers and storm stand-by tanks at Columbus, Ohio—John H. Gregory, the late Robert H. Simpson, Orris Bonney and Robert A. Allton.

Committee reports

Four of the society's standing committees were scheduled to report at the morning session, Wednesday, but in the absence of the chairman ot the committee on flood-protection data, that report was not presented. It will be published in *Civil Engineering* in the near future. For the committee on earths and foundations, Lazarus White made a progress report summarizing the work now in progress on soil mechanics in earth-dam construction and expressing the hope that when there is a revival in building construction similar exhaustive study will be given to earth foundations. Ralph J. Reed reported briefly on the progress being made by the committee on meteorological data, and E. P. Goodrich submitted a progress report for the committee on salaries, of which he is chairman. Mr. Goodrich reviewed some of the studies made by universities to determine the number of graduates finding positions in their own or in other lines, and presented statistics comparing the placement of graduates in several professions. He also summarized the results obtained so far by the committee in its very careful study of engineering employment in the state highway departments, data having been obtained from all but three or four states, also upon the committee's study of engineering work in counties, which so far has covered only about one-quarter of the counties in the country.

New officers

At the close of the business meeting the tellers submitted their report, and Arthur S. Tuttle, the retiring president, called the new officers to the platform and turned the meeting over to the new president, Daniel W. Mead. The other officers elected, as announced in our issue of last week, were Edward P. Lupfer and Harry W. Dennis, vice-presidents; Carlton S. Proctor, James K. Finch, C. E. Myers, Raymond A. Hill, L. L. Hidinger and E. P. Arneson, directors.

Public-works principles

The society's general session for technical discussion was devoted to the report of a committee of the engineering economics division on the subject of "Principles to Control Governmental Expenditures for Public Works." The committee consisted of Brig.-Gen. Charles Keller, chairman; W. W. DeBerard, western editor, *Engineering News-Record;* Fred Lavis and L. C. Sabin. Animated comment and criticism followed the presentation, and the report was finally referred back to the committee for reconsideration.

The committee's study apparently was motivated by the government's emergency program of public works for unemployment relief and stimulation of recovery, but the recommendations submitted made no distinction between emergency and normal public works. They are as follows:

1. The program should be based on sound economic considerations exclusively, and it should be formulated by a permanent and non-partisan federal agency, preferably one of the character of the United States Supreme Court.
2. Only those projects should be included that will answer a definite and well-established public need which cannot be met reasonably by private capital.
3. No project should be included which would duplicate or impair the value of existing property and facilities that afford adequate service to the public at reasonable rates.
4. Projects should be classified in the order of their relative merit, this to be judged on the basis of national, rather than merely local, benefits.
5. In classifying meritorious projects and in undertaking them, due weight should be given to their location with respect to the centers of unemployment, and to the amount of labor they will call for.
6. No project which cannot be justified in the light of the previous principles should be adopted merely to furnish employment.
7. In evaluating the benefits that would result from a project, it is important that all items of cost of the project, both direct and indirect, be considered. This is particularly necessary when the project is to take the place of an existing facility.

Review of some twenty discussions of the original report led General Keller to propose some revisions in wording, although he stated that the general sense of the recommendations was not affected. His remarks, together with the committee's detailed commentary on these recommendations, indicated that the committee is strongly opposed to the government's emergency works program, and that it is opposed to the national financing of local public works as conducted during the past three years, holding that "The activities of the PWA were so menacing to private capital as seriously to retard recovery." It also takes the view that public projects should be adopted on economic considerations solely, and that their general-welfare effect or social desirability should not be considered. General Keller's discussion, submitted in the name of the committee, specifically asserted that except in so far as economically-justified projects are adequate to employ all idle workers, direct relief should be depended upon "until such time as industry and business can employ them."

In discussion, Donald H. Sawyer objected to the inclusion of administrative methods with principles, on the ground that principles may be agreed upon, but specific administrative methods are likely to be subject to strong differences of opinion. Ole Singstad, of the Port of New York Authority, criticised the recommendation that projects *which impair the value of existing facilities* should not be undertaken and held that there is no need for the society in such a committee report to enter into questions of private or public ownership.

Prof. J. K. Finch, of Columbia University, objected to the recommendations on the ground that economic calculation does not determine the public desirability of projects, and that the people will insist on deciding between profit-making public works and works of general-welfare value whose benefits may not be directly measurable. Other speakers further criticised the attempt of the committee to base its recommendations on cost economics, ignoring the community value or social purpose of an undertaking. J. P. Hogan urged that it is rarely possible to measure the value or the productive power of a public improvement; that such undertakings as housing may produce values much larger than expressed in any probable direct return.

A. J. Hammond, of the committee on standardization of bridge clearance of the engineering economics division, announced that the division had recommended to the board of direction and that the board had approved the following recommendations: (1) that the War Department be requested to publish a complete list of bridges over navigable waters with information as to horizontal and vertical clearances; (2) that the board adopt a statement of broad policy with respect to clearances of structures over navigable waters to the effect that they should be such as not to interfere unduly with either land or water transportation, nor cause unwise expenditures to be made for physical readjustments, nor place burdensome restriction on future expansion; (3) that the Am.Soc.C.E. take up with American Engineering Council the advisability of requesting the Secretary of War to appoint an advisory committee on waterway clearances consisting of one representative each of the Corps of Engineers, the Am.Soc.C.E., the A.R.E.A. and the American Association of Port Authorities, to advise on proper clearances in various regions. Although some minor objection was raised as to the workings of the proposed committee, the recommendation was unanimously endorsed by the meeting.

Industrial sanitation

The sanitary engineering division opened its meeting with a paper by Charles L. Pool, engineer and chemist of the Rhode Island Public Health Commission, on the role of the sanitary engineer in the field of industrial sanitation in which it was emphasized that consideration should be given to the extent to which the sanitary engineering profession might expand its activity to cope with industrial sanitation problems. Although such expansion might necessitate certain specialization, present practices of the sanitary engineer are already somewhat analogous to the requirements demanded in industrial sanitation, so that adaptation should not be difficult. To aid in the orientation for cooperative endeavor, it was suggested that the first step would be to collect scattered information and make it available in usable form. The sources for such material would include data from medical, chemical, public health, labor, insurance, safety and research publications pertaining to industrial sanitation.

Discussion on this question was opened by Warren J. Scott, of the Connecticut department of health, who stated that while broadly trained engineers, chemists and physicians should cooperate in industrial problems, the limitations of the sanitary engineer make it impossible for him to deal alone with this widely diversified field of endeavor.

Multiple-stage sludge digestion

Experiences with multiple-stage sludge digestion were described in a paper by A. M. Rawn, A. Perry Banta, and Richard Pomeroy of the Los Angeles County Sanitation District. Using four heated tanks in series, each divided into three compartments with baffles, this method employs the principle of gravimetric segregation. As sludge undergoes decomposition, the digested solids and organic matter will sink to the bottom of a compartment, and the more resistant materials will float to the surface and pass into following compartments where further disintegration and deposition take place. There are twelve compartments in the four stages, and a selective series of digestive action takes place. Raw sludge entering the first-stage tank is mixed with approximately 20 per cent of returned digested sludge, thus providing a scheme of controlled seeding.

Conclusions based on a two-year period of full-size plant operation indicated that with a 10-day period of digestion (passage through four stages), there is a 46 per cent reduction of volatile matter, and the discharged sludge dried satisfactorily on sand beds. The gas produced in the first stage, representing 47 per cent of the total production, did not differ in fuel value from that produced in the other stages of digestion. Scum formation did not lower the efficiency of the process, and stirring or agitation of the tank contents were of no value in promoting digestion. Sludge-heating studies revealed that when a ½-in. layer of slimy scale (accumulated in 30 months' operation) was removed from the heat coils there was a fourfold increase in heat transmission; other investigations indicated that sludge digestion was not endothermic, and possibly might be exothermic in its heat reaction.

Garbage disposal in sewers

The grinding of garbage and its disposal to sewers were appraised in a paper by C. E. Keefer, of Baltimore, who stated that this scheme was used as far back as 1923 at Lebanon, Pa. Recent experiences indicate that the modern sewage plant can be adapted to combined disposal of sewage and garbage. Thus far no difficulties have been encountered in sludge-digestion processes, despite the increased grease content from garbage and the resultant heavy scum formation. Settling tanks are able to take care of the increased solid loads, but the effluents are 15 to 20 per cent higher in B.O.D. value. No deleterious effects, however, have been noted in the sprinkling-filter or activated-sludge process in handling these stronger effluents. Preliminary cost figures revealed that garbage grinding and subsequent treatment at sewage plants will be about $3.20 per ton as compared with incineration which varies between $1.26 to $2.50 per ton; reduction in hauling cost and the lower capitalized cost of relatively small central grinding stations, however, should reflect considerable savings in sewer disposal of garbage.

The Indianapolis garbage grinder, a temporary installation used while repairs were being made to the garbage-reduction plant, was described by C. K. Calvert, engineer of the Indianapolis Sewerage Commission. The grinding machine was located over the sewage-plant grit chambers, and it successfully handled all the city garbage at a cost of approximately 30c. a ton. It was noted that sludge digestion was more rapid and complete with the addition of garbage than without.

At St. Louis, the garbage is being ground in a 20-ton plant located over a trunk sewer that empties into the Mississippi River. William S. Johnson, sanitary engineer of the St. Louis health department, reported that the scheme was practical, economical and sanitary. There are no visible effects of the garbage content where the sewer discharges 2 miles from the plant, and the additional oxygen demand on the river is normally too small for measurement. The cost for grinding ranges from 30 to 35 c. per ton; the average load is 150 tons daily in the winter and 400 in the summer months.

A review of the factors affecting the design of aeration tanks for the activated-sludge process was presented by S. W. Freese, of Fort Worth, Tex., who carefully outlined theory and its reflection in prevailing practice both here and abroad.

Committee work summarized

The report of the committee on water-supply engineering, prepared by Thomas H. Wiggin, consulting engineer, outlined quantitatively the noteworthy work and study characterizing progress in 1935. H. Burdett Cleveland, in a brief review of the progress made by various technical committees, announced that the committee on filtering materials (water and sewage) which had been compiling data since 1925, rendered a final report that would soon be published as a manual of engineering practice and guidance; the report of the committee on sludge digestion is now being published and will be released within a short time.

The methods employed in making permeability studies of the earth dam foundations at the Quabbin Reservoir were described and illustrated with slides by Stanley M. Dore, assistant designing engineer of the Boston Metropolitan District water supply commission.

New division officers

Charles Gilman Hyde, retiring chairman of the executive committee of the sanitary engineering division, was succeeded in office by H. Burdett Cleveland. Harold W. Streeter was made secretary of the division, and Chester A. Gillespie was elected to fill the unexpired term of Charles W. Sherman, who resigned because of ill health. E. L. Waterman was the new member elected for a term of five years.

Equipment advance

The construction division's symposium on advances in construction equipment and methods marshalled some significant facts in papers by A. J. Ackerman, construction plant engineer of the TVA, by T. T. Knappen, U. S. Engineer Office, Zanesville, Office, by Lion Gardiner, Jaeger Manufacturing Co., by William Spraragen, American Welding Society, and by David S. Fine, American Bridge Co. In introducing the subject, Mr. Ackerman urged closer cooperation among engineers, contractor and equipment manufacturers, illustrating its beneficial effect by experience on the TVA work. On a recent nationwide trip, during which he visited many construction operations, Mr. Ackerman noted a rather unwholesome attitude toward engineers on contractors' staffs. Such an attitude, he feels, is obstructing progress and is to no one's best interests.

The unusually thorough construction-plant planning that has characterized the Norris, Wheeler and Pickwick Landing dam jobs was made evident by Mr. Ackerman's paper and lantern slides. At Norris, to take one example, the problem of aggregate and cement supply, of transportation, mixing and placing was originally worked out in skeleton form. This was followed by detail flow sheets for the materials, and then by basic operating charts for the various units, such as crushers, mixers, trains and cableways. The general requirements were submitted to the equipment manufacturers for bids and, after complete plant designs were available, plans were made showing signal locations and methods of operation, together with detailed instructions to each operator.

In reviewing the advances in earth-moving equipment from the early railroad building days, Mr. Knappen compared the decline in popularity of the mule and dump wagon, the slip scraper, the rail-mounted steam shovel, and the dipper dredge, with the mounting use of the tractor, trailer, truck and belt conveyor, the crawler shovel, the dragline, the tower excavator, the power scraper and the elevating grader. He, too, emphasized the usefulness of the engineer to the contractor on planting problems and predicted the coming of the construction consultant. Some such person is needed, in Mr. Knappen's opinion, to reduce the present huge credit losses resulting from high-pressure equipment selling.

Concrete handling

In the field of concrete handling, Mr. Gardiner picked out vibration, pumping and truck mixing as the outstanding examples of development over the past five years. The remarkably rapid acceptance of the concrete piston pump was made evident by the figures of yardage pumped—in 1932, 5,000, and in 1934 and 1935, 1,000,000 yd., in each year. Single- and double-cylinder pumps in capacities of 20 to 65 yd. per hour are available. Statistics also aided in an understanding of the truck mixer's contribution to concrete handling. The yearly yardages hauled were 2,600,000 in 1933, 3,200,000 in 1934, and 3,400,000 in 1935. About half of these yardages were mixed in transit, the other half merely being agitated. A recent development is a truck mixer for asphaltic concrete.

Structural erection

Structural erection practice has gone forward by steps of improvement rather than by wholly new practices, in Mr. Fine's opinion. The crawler crane has done the same good job for highway bridge building that the rail-mounted traveler did for railroad bridge building a quarter of a century ago. The truck and trailer have also influenced erection practice, particularly of girders which can be completely finished in the shop and hauled to the job in an upright position. Girders as deep as 13 ft., as long as 125 ft., and weighing as much as 130 tons, have been handled in this manner.

The adaptation of the guy derrick to cantilever bridge erection, replacing the traveler, has been a development of note. Long-grip rivets, sometimes of alloy steel and in diameters as great as 1¼ in., cannot be driven by the 100-lb. pressure formerly supplied by compressors. This resulted first in the introduction of booster units that raise the pressure to 150 lb., and lately in the development of two-stage compressors, for 140- to 150-lb. pressures. One of the distinctly new devices, also made necessary by joints requiring large rivets, is the mechanical wrench for tightening the fitting-up bolts. The first units were rotary air machines, and during the past year an improvement by which a combination of impact and twisting is imparted to the bolt has been introduced.

Frictionless bearings on machines and on sheaves, and successive changes in motive power, from steam to electric to gasoline and now to diesel, are other items of note. Lastly, Mr. Fine referred to the new attention being given to safety and accident prevention, as emphasized by the requirements for hard hats, tough and slip-proof shoe soles, safety belts and better scaffolding.

Structural alloy steels

Structural alloy steels, wind design of buildings and the economics of highway bridge floors comprised the subjects of committee reports and papers before the structural division. Each contributed new data and evidence of new thinking that attest to a maintenance of the high standards associated with this division's activities in the past.

The most significant development noted is the urge to explore the possibilities of more extensive use of structural alloy steels, as exemplified in the reports of A. V. Karpov (Aluminum Company), chairman of the committee of modern stress theories and fatigue research, and of Robert S. Johnston (John A. Roebling's Sons Co.), chairman of the committee on structural alloys. Mr. Karpov outlined the committee's plan for a symposium on structural alloys at the 1936 fall meeting of the society at Pittsburgh. The data to be contributed by this symposium will be utilized by the committee in its studies directed toward possible changes in design methods and recommendations respecting the economics of structural alloys.

Mr. Johnston's committee reported an exhaustive study of the past and present use of higher-strength steels, involving such alloys as silicon, manganese, nickel, copper, molybdenum, vanadium and chromium. Many complex steels incorporating the last three of these alloys are being proposed, but so far their possibilities have only been superficially explored. There is distinct evidence, the committee noted, that the near future will witness a gradual acceptance of some of these newer steels for structural purposes.

Since structural silicon steel was first used in the 720-ft. Ohio River span at Metropolis in 1915, practically all major bridges have utilized it, according to the committee's report. Mr. Johnston made the interesting observation that the Castleton bridge of the New York Central is the only long-span bridge built since 1915 in which ordinary structural carbon steel is exclusively used. Modern structural silicon steel usually contains more manganese than it does silicon; for a number of years there has been evident a trend toward decreased silicon and increased manganese content. The steel adopted ten years ago for the Delaware River Bridge contained 0.40 carbon, 0.45 silicon and 1.0 per cent manganese, and this specification has been generally followed since.

Carbon manganese steel containing 0.30 to 0.45 carbon, 1.60 to 1.80 manganese and 0.20 to 0.45 silicon, was used first in 1929 on the Bayonne steel arch, where it was substituted by the contractor for a specified nickel steel containing 1¾ to 2¼ per cent nickel, 0.92 manganese and 0.33 carbon. Nickel steel, first introduced in this country in 1908 for the eyebars of the Queensboro Bridge, contained 3¼ per cent nickel, and a similar composition steel has since been used in a number of bridges. Nickel has less tendency to harden a steel than some of the other commonly used alloys, but its cost differential has been too high to cause its general adoption in spite of this advantage, Mr. Johnston stated.

To show the recent changes in the silico-manganese types of steel, the report compared the steels utilized for the Louisville Bridge and the Golden Gate Bridge. Thus, in the five-year interval between these bridges, there is noted a decrease in carbon from 0.345 to 0.27, an increase in manganese from 0.77 to 1.25, and a decrease in silicon from 0.27 to 0.25. The Golden Gate steel has an ultimate strength of 88,000, a yield point of 55,800, and shows a reduction in area of 48.1 per cent, all slightly higher values than on the Louisville Bridge steel. The elongation in 8 in. remains about 22 per cent.

Suction in wind design

The fifth progress report of the committee on wind bracing for steel buildings was presented by the chairman, Prof. C. R. Young, University of Toronto. The report broke new ground in making recommendations for design methods on rounded and sloping roofs that take into account the local variations in suction and positive pressures. Thus for the windward side of sloping or gable roofs straight-line formulas are given which base the design wind force on the slope, if this is between 20 and 60 deg. Since there is no such relation for the leeward roof, it is suggested that the force be taken as a suction 0.6 times the velocity pressure for the particular slope. The committee points out that these external forces must be combined with internal or outward forces in actual design work.

With respect to walls, the wind force for the windward wall is recommended as 0.9 of the velocity pressure, and for the leeward wall as a suction that is 0.4 of the velocity pressure.

In its latest studies of tall-building wind design the committee has sought a method that would be simple enough to assure its adoption by the average designer. The method proposed by John E. Goldberg (slope deflection with converging approximations) seems to be best in the committee's opinion, particularly where the columns are stiff compared to the girders. The Goldberg method is also good for investigating irregular frames. Such frames do not lend themselves to analysis by the Spurr method, according to the tests of a steel model of 55-story bent at Ohio State University.

A part of the committee report was a review by Prof. F. P. Witmer, of the University of Pennsylvania, of tests of model bents in which the span widths and the relative sizes of girders and columns were varied. This work is reported in *Proceedings,* Am.Soc.C.E., January, 1936.

Highway bridge floors

A study of the economics of modern highway bridge floors, made by J. A. L. Waddell, was presented by Shortridge Hardesty, consulting engineer, New York, and chairman of the committee on bridge floors. In attempting a comparison of the numerous light-weight bridge floors now on the market, Dr. Waddell chose as a standard a solid concrete floor, 9 in. thick, weighing 110 lb. per sq.ft., and then reduced all available floors to a given weight per sq.ft., giving floors of 90- down to 40-lb. weights, an open grating of 15 lb. A cost per sq.ft. of each type was computed, and in the case of the lighter floors was adjusted for certain increases caused by a closer stringer spacing and by the necessity for use of cross-beams. With the floor unit costs established, the floors were applied to simple truss spans from 100 to 700 ft. long in both silicon and carbon, and to cantilever bridge spans from 500 to 1,200 ft. in silicon steel.

A general conclusion shown by the data was that in both the silicon and carbon steel simple spans, the light-weight floors as a group did not show a unit cost per sq.ft. advantage until after the span length reached 300 to 350 ft. On the cantilever bridge where longer spans ruled, the light-weight floors were all below the standard 110 lb. concrete floor in the order of their weights. For the shorter simple spans, the special light-weight floors are often considerably more expensive, since their original cost wipes out any small saving in truss steel and foundations.

Although movable spans were not investigated as completely as were the other types, enough calculations were made to indicate that all of the light floors have an economical advantage regardless of the span length, inasmuch as the saving here extends to the machinery and ropes as well as to the trusses and foundation.

Recent highway developments

Two papers of quite different character were presented to a small audience at the meeting of the highway division. Considering recent developments in highway paving, Julius Adler, consulting engineer, Philadelphia, Pa., commented in order on secondary (road-mix) surfaces, concrete pavements, bituminous (plant-mix) surfaces and brick pavements.

Progress in soil surveys and in soil stabilization for both base and surfacing was emphasized as a development of decided importance. On soil surveys reference was made to the detailed procedure laid down by the A.S.T.M. as a sound manual of practice but calling for rather burdensome operations and a rather special technical training. Simplification seemed called for if the fullest service of soil mechanics to roadbuilding was to be realized.

Bituminous roads of plant-mixed materials were indicated as showing most improvement in surface manipulation to improve traction and in stability of mixtures; with the last, however, there had come increased cracking. Cold mixes of cutbacks, emulsions and powdered asphalt and a flux were noted as having a greatly increased use. In general bituminous road practices need a complete restudy and a revamping of specifications.

The improvements in brick paving have been the vertical-fiber wire-cut lug brick with de-aired brick in the offing and the development of processes of removing excess joint filler.

The second paper was a pictorial description of the connecting road systems to serve the Triborough Bridge, New York, by J. C. Evans, engineer of approaches, Triborough Bridge Authority.

City planning

Aside from committee reports on special assessment factors, blighted areas, underground utilities, street naming and a subdivision manual, the city planning division concentrated its two sessions on two subjects only: use and limitations of work relief in the advancement of planning programs and the future of land subdivision and its problems.

Location of underground utility conduits and structures in standard positions is essentially the recommendation of the final report of the committee on the subject headed by A. W. Consoer. All other reports were progress reports only. Prof. Frederic Bass stated six factors which should be considered in making equitable assessments. Laws of many cities have been classified. Assessments, the report stated, should not be confused with taxes for governmental activities. Causes and other factors relating to blighted areas in Cleveland as disclosed by real property inventories and census studies made up the bulk of the progress report on blighted areas by Howard Green.

Harold M. Lewis presented an exhaustive account of the difficulties encountered in attempting to utilize work relief on planning projects. Results have been discouraging. Difficulty or impracticability of defining a planning project and failure of officials to recognize the difference between statistical and planning projects account for most of the misunderstanding charged to red tape.

In discussion R. H. Randall, consultant for the National Resources Committee, indicated that most of the limitations were self-imposed. Statistical projects can be defined much closer than planning projects and personnel can be found on relief rolls to man the former. Much assistance from federal sources has been given to state planning boards who are expected to guide the local boards. Experiences in St. Paul and Minnesota were outlined in discussion by George H. Herrold. His greatest difficulty was in finding talent that could prepare reports. Lack of enough supervisory personnel reduced greatly the effectiveness of work-relief help. No small communities got anything worthwhile because of the lack of suitable personnel. Harold R. Dean said the endless red tape, seemingly useless, erected insurmountable barriers against getting federal funds in many New York counties.

Future land subdivision and its problems were outlined by Harland Bartholomew as a preliminary to the preparation of a manual on the subject. He defined land subdivision as part of the ultimate process of fitting dwellings to the land in the most satisfactory manner by taking into account all the physical, social and economic questions involved in each particular instance. Stress was laid by Mr. Bartholomew on the amount of subdivision needed, on where it should take place, its form, the need for a definite urban land program, the necessity of developing large neighborhood units rather than lots or blocks if a good environment is to be attained, and finally a realistic approach to the problem of land subdivision and housing.

In discussion Henry Wright deplored the present method of subdivision long in advance of use. He would make the lot conform to the requirements of the building. Future developments such as air-conditioning, he said, will change lot layout. For example, 75 per cent of the heat load in summer is due to sun. How the house faces will therefore appreciably affect costs. Mr. Wright is an advocate of laws requiring subdividers to obtain a certificate of necessity before starting new projects. One way to hold people to the older districts inside the cities is to make the inside area more attractive.

Russell V. Black said the very shoddiness of many buildings fortunately speeds the time when they will be removed. Population forecasts of stabilization do not bother him since too little is known of trends for the indications of slowing up to be pertinent as yet. H. O. Pond held similar views in a long discussion outlining the bad practices of the realtor, subdivider and financier. He especially noted the effect of highways and automobiles in spreading out city growth. Control of lot sales should be no more objectionable than control of food sales.

Letters to the Editor

Steel vs. Concrete Bridge Trusses

Sir—In the article describing the design and construction of a reinforced-concrete highway bridge near Tacoma, Wash., (*ENR*, Jan. 2, 1936, p. 1) it is stated, "The steel layout was of standard type, commonly used for light highway work." However, there is nothing said in the description of the design assumptions on p. 2 as to what design specifications were used for the steel layout. Was the steel design made in accordance with the old or the new A.A.S.H.O. bridge specifications? If the former, then it can be confidently stated that a use of the most recent A.A.S.H.O. specifications would result in a different answer to this economic comparison between steel and concrete bridge designs.

It is to be noted that the steel layout provided 4,080 sq.ft. of roadway surface with a clearance of 25 ft. 6 in. between trusses as compared with 3,740 sq.ft. and 24-ft. truss clearance for the concrete structure. The true comparative costs of these two designs were therefore, $9 per sq.ft. of usable roadway for the steel design and $9.60 per sq.ft. of usable roadway for the concrete structure. It may be said that the concrete design provides two 3-ft. sidewalks. The bridge, however, is 15 miles out in the country and therefore needs no sidewalks, which in this case, were apparently provided as a result of accidental circumstances, there being a width of 3 ft. available inside each truss.

As the new A.A.S.H.O. bridge specifications were not issued until after these two designs were made, it is reasonable to assume that a present-day design comparison would show the steel structure as even less expensive than it really was. In view of the comparative per-sq.ft. costs above quoted, the conclusion that the steel bridge was more expensive than was the concrete bridge is misleading and unwarranted. A proper economic comparison between the two structural designs should be based upon truly comparable assumptions.

F. H. FRANKLAND,
Chief Engineer,
American Institute of Steel Construction.

New York, N. Y.,
Jan. 3, 1936.

Earthquakes and Torsional Stresses

Sir—In the authoritative article "Earthquake-Resistant Construction Applied to California Schools," by C. H. Kromer, published in your issue of Dec. 19, 1935, it is stated that if the line of action of the resultant of the forces does not pass through the center of resistance of the building, torsional moments will be produced which must be considered in the design. The method of analysis pertaining to this requirement is, however, by no means obvious and, as far as the writer knows, the authorities entrusted with the enforcement of the Appendix A or Temporary Regulation No. 5, relating to the safety of design and construction of public school buildings in California, have never attempted to elucidate this obscure point officially.

Only recently in an article "Lateral Loads on Piers, Rotational Effect of Seismic Loads," H. C. Whittlesey, senior structural engineer, California division of architecture, gives a solution in the *Buliding Standards Monthly*, November, 1935, which evidently reflects the views of this division. The method of analysis developed in this article is, however, somewhat crude, and in the case of horizontal loads acting obliguely it fails completely.

Although the problem of torsional effect of earthquake forces upon buildings has been solved by Professor A. R. Roussopoulos and published in the Technical Annals of the Technical Chamber of Greece, Sept. 1, 1932, under the title "Distribution of Horizontal Forces to Supporting Members by Means of a Rigid Slab" (in Greek), this excellent paper remains yet unknown to the engineers in California. The problem involves the tracing of the ellipse of displacement for each column head and wall top. These displacements represent the loci of the deflections caused by a horizontal earthquake force coming from any direction. The method, therefore, is quite general. The major semi-axis of these ellipses gives the maximum deflection of the above-mentioned structural members in magnitude as well as in direction. Translation of this paper into English is much to be desired.

Los Angeles, Calif.,
Dec. 27, 1935.

A. FLORIS.

ENGINEERING NEWS-RECORD

Volume 116, No. 4.

Copyright, 1936, by McGraw Hill Publishing Company, Inc.

EDITOR—F. E. Schmitt. EDITORIAL STAFF—V. T. Boughton, N. A. Bowers, W. G. Bowman, W. W. DeBerard, C. S. Hill, H. W. Richardson, E. J. Cleary

Editorial and Publishing Offices at 330 West 42d Street, New York

January 23, 1936

For the Average Man

IN ITS ANNUAL REPORTS the wind stress committee of the American Society of Civil Engineers has heretofore largely centered its attention on the problems of the tall building. To the average engineer, concerned with small and average buildings, such stratosphere design has small usefulness. This year, however, the committee has something for the ordinary engineer; its recommendations concerning variable pressure and suction on rounded and sloping roofs and on lee walls are directly applicable to ordinary practice. For forty years test data have been accumulating to show the existence of suction areas at various locations on buildings subjected to wind, but until now there has been no official recognition of the fact in this country. Russia and the Netherlands have given such recognition through their national building codes. The committee used experience in these countries in its studies and also called upon the notable wind-tunnel work of Dryden and Hill at the Bureau of Standards at Washington. In breaking this new ground the committee recognizes that its recommendations cover only external pressures and suctions, whereas fully logical design must take into account the internal forces outward and upward. W. W. Pagon, in his recent series of articles in this journal on "Aerodynamics and the Civil Engineer," emphasized the controlling importance of these internal forces. So, while the committee has something for the average man, it has not yet put it in completely usable form. With this beginning, however, there is hope that progress may soon be sufficient to safeguard roofs and walls against hurricane and tornado winds.

•

Help for the Judge

THE PLAN of the American Society of Civil Engineers to investigate the desirability of asking the Secretary of War to set up a bridge clearance board, to formulate basic policies, has much to recommend it. Members of the board would come from the War Department, the American Railway Engineering Association, the American Society of Civil Engineers, and the Association of Port Authorities, so that opportunity would be offered to strike some kind of an economic balance between the claims of land transport and shipping. In its jurisdiction over bridge clearances the War Department has had to sit not only as the sole judge but also as a judge without guidance from basic modern data. As a result, its rulings have often shown an inconsistency that causes the bridge engineer considerable trouble, and in the more extreme cases where exceptionally high clearances have been demanded the taxpayer has been a victim because of the longer approaches required. If the War Department had available a basic policy or even expert bi-partisan advice on bridge clearances predicated on the reasonable requirements of both water and land traffic it would be in a much stronger position to rule fairly and with some semblance of economic foresight. The proposed plan would give the Secretary of War an opportunity to place his department in a much more favorable position in ruling on bridge clearances. The judge needs help, and in this case he would have an opportunity to help himself by appointing the proposed advisory board and utilizing its services.

Large Tunnels

TUNNEL BUILDERS of a few decades ago who marveled at the size of double-track railway tunnels would be astonished were they to walk into the tunnel driven through Yerba Buena Island for the San Francisco-Oakland Bay Bridge. At the springing line of the arch the rock cut is 79 ft. wide, practically the same as the span of the Rove Canal Tunnel in France, but in center height (48 ft.) it is half again as large. It far exceeds the size of any tunnel yet driven; indeed, viewed as a rock chamber it is exceeded in size only by the arched opening of 119-ft. span cut into the canyon wall below the Sautet Dam in France for a power plant. Great size is not in itself a measure of engineering skill, of course; great chambers may easily be cut in soft, homogeneous rock, as was done even in medieval times. But hard rock, especially when it is shattered and badly folded, as at Yerba Buena, and when pressures may develop, calls for the highest skill of the tunnel builder when a great opening is to be cut in it. For this reason the procedure used in the Yerba Buena work is of interest. Especially notable is the small amount of timbering required and the large amount of excavation handled by ordinary rock methods.

Industrial Questions

WITH THE ORGANIZATION of seven committees to study as many separate industrial questions, the much-discussed Industrial Council has made a start toward results whose value will depend altogether on the effort, sincerity and understanding put into the work. The representation of industry on the council is at present too small to be significant, as the major industries are not represented—a natural sequel of the unfriendliness and dissension which marked the initial conference early in December. But the council should not find it difficult to overcome this handicap if it shows that it is setting about its work purposefully and intelligently. Unsound competition, the maintenance of quality standards, labor relations, industrial stabilization and a host of other industry questions await competent discussion, and if the council enters upon their study with due energy its work can be useful both in accelerating recovery and in helping to stabilize industry in the future. What its initial studies produce will therefore be awaited with universal interest, as an indication of its ultimate contribution to a better economic system.

Immersed Timber

SEATTLE has just constructed an interceptor sewer of wood-stave pipe, not as a temporary expedient but as part of the permanent system serving that city. Being a pressure line, the pipe will be permanently wet on the inside, and as it is immersed below tide level for its full length the outside also will kept wet. How long will timber last under such conditions when protected from marine borers? The city's testing laboratory recently made tests on some untreated fir timber (the same wood used in the sewer outfall) which was known to have been immersed in Lake Washington for 40 years. It showed compressive strength of about 8,000 lb. per sq.in.—a strength which supports the favorable conclusions drawn from tests made at Stanford University some years ago on timber immersed for a similar period. Even though that long-immersed timber deteriorates rapidly after drying out, there is ample evidence to show that sound and properly protected timber when kept immersed has an almost indefinite life. In recognizing and making use of this fact the Seattle design represents good engineering.

No Lighted Roads

UNTIL there are lighted highways night driving is not a safe use of the public road. Accident statisticians can, if asked, furnish somewhat convincing figures of the extra hazards of darkness, but the road user requires no proof beyond his own experience. Lights are at his service on cars and by the roadside, but nowhere has he a lighted road. The distinction deserves to be thought of seriously for it is the nub of the problem of making the highway safe by night. The chief safety requirement for night driving is a distinctly defined path, one whose boundaries are visible a safe distance ahead for modern speeds. If the path is truly visible, objects on that path which the driver needs to avoid will be visible.

Lights on cars or where they are provided along the road do not increase vision but on the contrary confuse it by glare and alternating pools of light and darkness. It may be doubted if lights are the only or even the most important factor of the problem, and we know far more about their properties and location and of the laws of vision than formerly. Roads offer different possibilities in texture, in color and in methods of being lighted, and little has been told us about these possibilities. Again the settler along the road, the shopkeeper and inn-keeper and vendor of gasoline sets up lights that conflict with the road lights and we know little about these except that they are confusing. These conditions, in short, all lead to the conclusion that we have made no study of lighted roads but only of road lights, and until we design roads for effective lighting as well as improve lamps and their location a lighted road will remain as it is now—substantially unrealized. Fundamental research in road lighting yet remains to be undertaken.

Sludge Incineration Wins

THE SLUDGE INCINERATOR at the Calumet plant of the Chicago Sanitary District, described in this issue, is a further step toward mechanization of sewage treatment. Its installation, moreover, emphasizes the fact that incineration of sewage solids has advanced beyond mere theoretical deduction and has definitely entered the realm of practical application. A furnace for the destruction of dewatered chemical sludge has been in successful operation at the Dearborn, Mich., sewage plant since February, 1935; the Calumet incinerator is of different type and will burn vacuum-filtered activated and raw primary tank sludge as it is drawn from the settling units.

Sludge disposal has been one of the most troublesome problems in sewage treatment. While separate sludge digestion and drying have perhaps been the most satisfactory method to date of dealing with sewage solids, at best it is only a partial process because there still remains the problem of final disposal of the digested and dried sludge. In addition, the facilities required for the process not only occupy large areas of land but represent an unusually big item in capital investment. The recent utilization of the gas-byproduct of digestion for power generation has considerable merit, but it is doubtful if this feature produces sufficient financial return to warrant the continuance of digestion on this basis alone.

The logical scheme for sludge disposal is a method whereby the putrescible solids can be completely reduced to an inert substance of insignificant volume within a short time after their accumulation. The Chicago Sanitary District, after extensive studies and semi-plan-scale experiments, concluded that not only does incineration meet these requirements but it also is the most economical of all the processes investigated. This conclusion led up to installation of the Calumet incinerator and the adoption of a similar scheme for the new Southwest treatment works. In view of this tangible proof of the advantages of incineration, it is not extravagant to forecast that in the near future most sewage sludge is destined to be burned.

Engineers Recognized

A FREQUENTLY HEARD COMPLAINT among engineers is that the public does not recognize the important place occupied by the engineer and his works in the complicated and delicately balanced organism that is modern civilization. That the public generally does not accord credit to the engineer for his part in modern civilization is quite true, chiefly because the public is not conscious of how essential the works of the engineer are to his daily life. It takes some major interruption to an essential service to arouse that consciousness. Just this was the effect of the short circuit in the Hell Gate power station at New York during the early evening of Jan. 15 that shut off the power supply of practically all of the city north of Sixtieth St., demoralized subway and elevator service, put out traffic signals and street lights, and disrupted a multiplicity of services that depend on electric power. Commenting on this breakdown the *New York Times* said:

> How utterly dependent we are on the engineers! They and the scientists hold us in the hollow of their hand. How many of them are there? A hundred thousand, a million—who knows? They constitute a new ruling class. Destroy them and the country would be laid low. Disease would decimate us, transportation would be impossible, telephone and telegraph would be silent, starvation would stalk in the cities, factories would stand idle. Technocracy? The term is in bad odor. But there are technocrats for all that—knights not of the sword but of energy. When the lights go out we become aware of our rulers.

Such recognition is not without its serious side; it serves to emphasize the magnitude of the responsibility for maintaining continuity of the services that engineers have made possible. A century ago there were few community services, and such as there were could be interrupted for a considerable time without very serious inconvenience to anyone. But today life in all our larger urban centers is entirely dependent on the services of water supply, power, heat, light, transportation and communication. It is necessary to remember that even in the matter of food we live on a hand-to-mouth basis, so that life itself is dependent on community services that engineers have built. Engineers may well take pride in these services, but unless they can also insure their continuity they have not lived up to their full responsibility.

CURRENT NEWS

Consulting Engineers Elect New Officers

Edwin F. Wendt, Washington, and Gavin Hadden Chosen to Head the Institute of Consulting Engineers

AT the annual meeting of the American Institute of Consulting Engineers held on Jan. 14 at New York, Edwin F. Wendt, Washington, was elected president, and Gavin Hadden, New York, vice-president. Philip W. Henry was re-elected secretary and treasurer.

The Institute's committee on development, Fred Lavis, chairman, presented the results of study and correspondence discussion of the problem of securing better appreciation by governments and private industry of the need for skilled engineering advice. The committee concluded that active work is necessary to impress both public and private authorities with the value of engineering service especially in its preliminary or "preventive" function. The committee protested against the initiation and development of government projects through directly employed engineers in place of independent consultants retained to advise; only through the latter, said the committee, can valid opinions on the real value of projects be obtained.

The committee also criticised reports by philanthropic foundations on matters extending into the engineer's field, as a recent report on county governments in New York, "whose reports on the public-works and engineering phases of county government leave a good deal to be desired from a competent engineering point of view." Membership of engineers on planning boards was also demanded.

Much active work in connection with proposed legislation was done by the Institute during the past year, the president reported. A special report is now under preparation which will present the result of representations made to governors to bring about fuller use of engineers in connection with public planning.

◆

Contract Let for Section of West Side Highway

Contract for the final section needed to complete the West Side elevated express highway from Canal St. to 72nd St., New York City, was awarded on Jan. 20 to James Stewart Co. This last section will extend from 46th to 59th Sts., connecting with other sections already in operation. Construction of this section was delayed because of the building of four new 1,000-ft. piers in this area. Because of the necessity for partly relocating the streets in order to allow room for the large piers, it was necessary to design the highway so that it might swing one block to the east throughout this area, after which it will be swung back and continued in its original course.

It is planned later to continue the elevated highway from Canal St. to Battery Park at the lower end of Manhattan Island, and when the highway relocation north of 72nd St., which is now under way, is completed there will be a main through highway extending practically the full length of the island from its southern tip to 125th St.

Fifth Avenue tunnel proposed

A tunnel through the rock hill in Mount Morris Park has been proposed as a means of continuing Fifth Ave. as a through north and south route. Mount Morris Park is located directly in the path of Fifth Ave. between 120th and 124th St., making it necessary for traffic to be diverted east to Madison Ave. for the four blocks. The proposal calls for a tunnel of the same width as Fifth Ave. and about 600 ft. long. The tunnel would be unlined and without ventilation or sidewalks and would greatly expedite traffic without destroying the use of the park as a recreation area.

◆

Fred R. Low Dies; Editor and Engineer

Fred R. Low, an international figure in engineering, editor emeritus of *Power* and past president of the American Society of Mechanical Engineers, died at his home in Passaic, N. J., on Jan. 22. Mr. Low was 75 years old at the time of his death and had been confined to his home for over two years by failing health. At the time of his retirement in 1930 he had served as editor of *Power* for 42 years having come to it with a background of knowledge of mechanical engineering gained in working on the problems of textile-mill power plants while with the Journal of Commerce, Boston.

Early in his career Mr. Low joined the A.S.M.E. and always was active in its affairs, serving on many of its committees, as vice-president in 1918 and as president in 1924. A clear thinker and forceful writer, he made his influence felt far outside his chosen field of activity. At the time of his death he was still serving as chairman of two of the important A.S.M.E. committees. He was one of the few men chosen for honorary membership in the British Institution of Mechanical Engineers.

◆

Milwaukee Gets Refund on Sewage Funds

Impoundment of 15 per cent only of the proceeds of sales of milorganite (dried sewage sludge) by the Milwaukee Sewerage Commission is all that is necessary according to an order of the Chicago Circuit Court of Appeals modifying an earlier order of F. A. Geiger, federal judge, impounding the total proceeds of sales to pay royalties claimed by Activated Sludge, Inc., for infringed patents. This 15 per cent was indicated as enough to meet reasonable royalties which may be awarded to Activated Sludge, Inc. More than $300,000 had been impounded.

General Contractors Meet At Miami

Associated General Contractors of America at annual convention in Miami, January 13-15 acts to revive committee work.

THE seventeenth annual convention of the Associated General Contractors of America was held in Miami, Fla., on January 13-15 with delegations from all parts of the United States in attendance. The convention reviewed the problems confronting the industry, particularly those concerning work affected by federal regulation, and the situation in the field of private construction was carefully analyzed and plans for the future developed. Officers for the coming year were also elected during the meeting.

The association went on record, by resolution, instructing the organization to revive its committee work as speedily as possible with all branches of the industry for voluntary cooperation to bring about improved business relationship. This work had been interrupted because of economic conditions and by code authority regulations during the NRA era. Another resolution called attention to the trend of increasing private construction, pointing out that past records had always demonstrated that such trend was an infallible indication of returning industrial health; that such trend might be expected to continue with acceleration unless interrupted by intervening influences disturbing to the investment of capital in long term securities. Instruction was given to the officers of the national office of the Association to investigate all situations likely to be adverse to the continuance of the present trend and to make available full facts establishing the soundness of this conclusion.

The convention also recommended the reconsideration of the multitude of regulations now attached to publicly financed work on the basis of past experience, so as to accomplish greater workability and to eliminate present confusion and experience without adequate returns to increased employment which is now resulting in many instances. The convention reaffirmed its confidence in and appreciation of the work of the Bureau of Contract Information, Washington, D. C., and commended the surety companies affiliated with, and supporting the work of, the Bureau.

The Association also expressed the view that in the reorganization of PWA field offices selection of administrative directors should be filled by experienced and qualified persons of engineering and architectural training, as present methods do not attain desired results.

Highway division presents program

The highway division, with E. P. Forrestel presiding, discussed the future of the highway program and the possibility of the cancellation of the $125,000,000 federal-aid highway program for the fiscal year 1936. The highway division also recommended a four-year highway program and the continuation of regular aid highway appropriations without interruption and in an amount of not less than $125,000,000 in federal-aid to the states each year. This recommendation was adopted by the Association.

The building division, with F. L. Shackleford, presiding, gave principal attention to problems arising under PWA and to ways and means of accelerating the trend of increasing private construction. The heavy construction and railroad division, with L. S. Oakes, presiding, considered the future program in its field and the regulatory problems that are faced. The social security legislation, both national and state, was discussed by all divisions.

Officers elected

At its meeting the Association elected the following officers for the coming year: president, W. A. Klinger, Sioux City, Iowa; E. P. Palmer, New York City, vice-president at large; William Muirhead, Durham, N. C., was reappointed as secretary-treasurer.

V. Ray Gould of Omaha, Neb., and J. N. Clifton, Spokane, Wash., were elected vice-presidents for zones 6 and 8, respectively. E. P. Forrestel, Akron, N. Y., was elected director of districts 2 and 3; George P. Zouck, Baltimore, Md., was elected director for districts 4 and 5; S. M. Siesel, Milwaukee, Wis., was elected director for district 7, and Ernest W. Everly, Albuquerque, New Mexico, and H. B. Zachry, Laredo, Texas, were elected as the directors for districts 12 and 13.

Prominent speakers

Among some of the outstanding speakers who addressed the convention were: Major General Edward M. Markham, Chief of Engineers, U. S. Army; H. K. Bishop, chief, Division of Construction, Bureau of Public Roads; W. E. Reynolds, assistant director of procurement, in charge of construction, U. S. Treasury Department; J. Howard Ardrey, assistant to the administrator, Federal Housing Administration; Walter Burr, director, National Reemployment Service, U. S. Department of Labor.

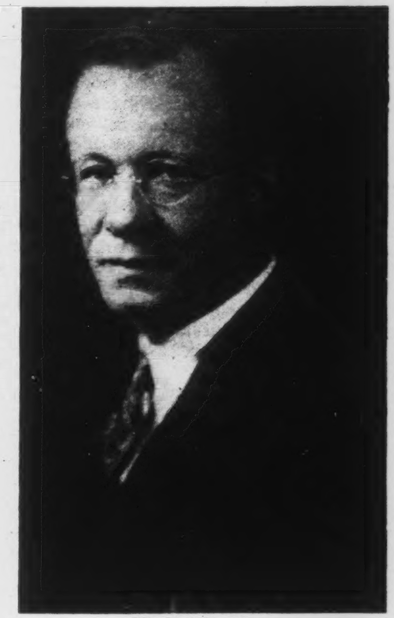
Office Building for Public Administration Societies

The University of Chicago announced on Jan. 16 that it had received a gift of $1,000,000 from the Spelman Fund, New York City, which is to be used for the erection and maintenance of a national headquarters for the seventeen public administration organizations that have been operating at the university during the past five years. The building, which is to be erected on university property near 60th St., is expected to be ready for use in about eighteen months. The use of this building by the Public Administration Clearing House and other groups, such as the Joint Secretariat of the International Association of Public Works Officials and the American Society of Municipal Engineers, is to promote better relationships between the theoretical work of the university and the practical work of the Public Administration Clearing House and its allied organizations. Dr. Robert M. Hutchins is president of the University of Chicago and Louis Brownlow is head of the Public Administration Clearing House which coordinates the functions of its affiliated groups.

Road Show Gets Under Way

Road Builders equipment show in Cleveland surpasses former exhibitions; W. T. Chevalier elected A.R.B.A. president.

THE ROAD SHOW, being held in conjunction with the American Road Builders Association convention in Cleveland, Ohio, got under way on Jan. 21 in the Cleveland Auditorium with 230 exhibits covering 2½ acres of floor space and eclipsing old-fashioned road shows by a brilliant display of construction equipment. The variety of new equipment produced since the last show, which was held three years ago, and the improvements of a number of the old lines amazed the throngs of interested buying visitors, who found that the trend of new construction equipment is toward fast, large-capacity units and specialized units designed to meet the more exacting requirements of the rising engineering standards. Evidenced by a large number of exhibits is the indication that much construction equipment industry is now traveling on rubber. Pneumatic tires now take their place alongside the crawler treads that have become so popular for mounting construction equipment in recent years. A report on the products exhibited at the 1936 Road Show, along with complete reports of the American Road Builders' Association convention will be published in next week's issue.


W. T. Chevalier

Willard T. Chevalier, vice-president in charge of *Engineering News-Record,* and other engineering and construction papers for the McGraw-Hill Publishing Co., was elected president of the American Road Builders Association at the annual convention in Cleveland, Ohio, Jan. 20-24. For the past five years Col. Chevalier has been president of the Highway Industries Association, a section of the American Road Builders Association. He is also a past president of the Metropolitan Section, American Society of Civil Engineers. During the war he served with the railway engineers in France.

Mortgage Associations Planned For Housing Program Aid

To mobilize an ample supply of private capital for home construction, an important phase of the housing program, in which President Roosevelt now is taking active hand, a group of government housing executives headed by Peter Grimm, of the Treasury Department, is developing plans to establish national mortgage associations for discounting FHA insured mortgages.

As at present proposed, one association would be capitalized by the government at probably $25,000,000 and others of $10,000,000 to $20,000,000 by private capital or a combination of private capital and government funds. Each association would be authorized to issue debentures for sale to the public to the extent of twenty times its capital stock against FHA insured mortgages. By taking such mortgages off the hands of life insurance companies, building and loan associations, savings banks and other institutions, this plan is designed to release a huge volume of their investment capital for home building. It would also be very useful, according to some authorities, in financing FHA sponsored low rent housing projects which depend entirely upon private capital. This program has been handicapped because there has been no means of issuing securities against such mortgages to the public.

The new plan brings to life the provisions of the National Housing Act of 1934 for the establishment of privately capitalized national mortgage associations under FHA auspices. These proved unworkable in their present form and such legislative authority as the new plan requires will take the form of amendments to this law. With better discount facilities FHA insured mortgages are expected to become more attractive. The RFC now is the only discount agency and lenders are not convinced that this assures complete liquidity of their investments. FHA has to date selected for appraisal 68,263 mortgages totaling $263,700,000. Volume is expected to grow enormously under the scheme by which such mortgages are converted into coupon form for offering on the investment market. The plan for establishing the mortgage associations is still tentative but is expected to take definite form within two or three weeks when it will be submitted to President Roosevelt.

Charles F. Kettering Receives Washington Award

Charles F. Kettering, vice-president in charge of research, General Motors Corporation, Detroit, Mich., has been elected by the Washington Award Commission to receive the Washington award for 1936.

Mr. Kettering, who was selected from a group of 26 candidates, receives the award as an outstanding engineer who has rendered pre-eminent services in promoting the public welfare through his outstanding contribution in the automotive field and his use of research as an instrument to increase the public welfare. The award will be formally presented on Feb. 27.

The award is given annually, when deserving candidates are found, by the Washington Award Commission of eighteen members representing the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers and the Western Society of Engineers. The Washington Award was founded in 1916 by John Watson Alvord through an endowment and a suggestion that there should be some means of recognizing outstanding engineers. Since the inception of the award it has been granted to only eleven persons, as the commission in some years discovered no candidate eligible for the recognition.

The men who have already received the Washington award are: Herbert Hoover, Robert W. Hunt, Arthur N. Talbot, John Watson Alvord, Orville Wright, Michael Pupin, Bion Joseph Arnold, Ralph Modjeski, William David Coolidge and Ambrose Swasey.

Dr. Humphreys Retained As Weather Consultant

William J. Humphreys, meteorological physicist in the U. S. Weather Bureau since 1905, who retired Dec. 31, 1935, after 30 years of active service, has become a collaborator of the Bureau. Under a special arrangement, he will now devote his time to research and writing on subjects in which he is most interested and to the solution of technical problems referred to him by the Bureau.

Dr. Humphreys received his preliminary training as a physicist of the air at Washington and Lee University, the University of Virginia, and Johns Hopkins University, from which he received a Ph.D. degree in 1897.

Dr. Humphreys entered the Weather Bureau as meteorological physicist. Until June 30, 1908, he was supervising director of the Mount Weather, Va., meteorological research observatory. Since then he has served continuously at the Central Office in Washington, D. C. For the last four years he edited the Monthly Weather Review, in addition to carrying on his other work.

L. W. Robert, Jr., Resigns Treasury Post

L. W. Robert, Jr., Assistant Secretary of the Treasury, since April, 1933, has resigned his position in order to resume his practice as consulting engineer and architect. Mr. Robert had charge of the Office of the Supervising Architect which handles plans and contracts for all federal buildings, and also the general supply committee which serves as purchasing agent for ordinary supplies for the governmental departments and agencies. Mr. Robert was graduated from the civil engineering department of the Georgia School of Technology in 1908 and in the following year received an electrical engineering degree from the same institution. For several years before graduation he was on railroad construction work, and since graduation has specialized in industrial building work, first with Park A. Dallis, mill architect and engineer, Atlanta, Ga. In 1917 he organized the firm of Dallis-Robert Co., architects and engineers, and a short time after organized the firm of Robert & Co., industrial architects and mill engineers, with headquarters at Atlanta.

Silicosis Hearings Continued

Testimony of alleged silicosis victims continued at labor subcommittee hearings inquiring into the conditions under which men worked in the Hawk's Nest tunnel, charges use of dry drilling, labor outrages and poor ventilation.

HEARINGS before the House subcommittee on the alleged silicosis deaths in the Hawk's Nest power project tunnel on the New River, W. Va., completed for the new Kanawha Power Co. in 1930-1932, were continued this week with added testimony from alleged victims of the disease and their relatives. As yet no witnesses have been called for the contractor, Rinehart & Dennis Co., Charlottesville, Va.

First of the witnesses, Mrs. Charles Jones, of Gamoca, W. Va., told the subcommittee she had lost three sons to the disease, and that "dust covered the boys like flour" when they returned from work. Mrs. Jones said she got $800 for each of their deaths. Charles Jones followed his wife with complaints against working conditions in the tunnel. He declared that just about the time the tunnel was completed men started dying. The witness said that he got $800 in settlement for silicosis he had contracted himself. He worked in the tunnel 14 months carrying drinking water. This witness and others complained about the manner in which silicosis claims were settled. He said that lawyers forced men with claims to sign a release before settlements were made.

Charges dry drills were used

Hiram Skaggs, Gauley Bridge, W. Va., who worked in the tunnel six weeks as a drill mechanic, detailed conditions he said existed in the tunnel. He charged that four wet drifter type drills and ten to twelve dry sinker type drills were worked in No. 1 heading of the tunnel. He charged that gasoline motors were operated in the heading, making it more difficult to breathe, where already there was not sufficient ventilation.

Arthur Peyton, Glen Ferris, W. Va., who said he worked with engineers of the New Kanawha Power Co., in the tunnel, charged negligence against that company, the contractor, and the West Virginia Buread of Mines for failing to take precautionary measures in constructing the tunnel. He claimed that although he and the other nineteen engineers for New Kanawha Power Co., used respiratory masks after they had been in the tunnel about seven months he was now in the primary stages of silicosis. He charged that dry drilling would be stopped and gasoline motors would be taken out of the heading when state mining inspectors were known to be coming around. He also stated that men were driven back into the tunnel by foremen directly after a blast had been set off, and he agreed with the testimony of the previous witness concerning the number of wet and dry drills used and estimated that 70 per cent of the dust in the tunnel could have been cut down by use of wet drilling entirely. He charged foremen of the contractors with labor outrages and said that men were paid $3 per day in checks which the company charged ten per cent to cash. Peyton said that he had been overcome with carbon monoxide gas from gasoline engines in the heading and had seen 28 men, so overcome, carried out of the tunnel in one night. Peyton also told the committee that when the alleged silica deposit in the tunnel was reached the bore was increased from 38 to 46 ft. to take out the silica rock.

Speed held paramount

Through a series of decidedly leading questions, Representative Marcantonio tried to build up the theory that Rinehart and Dennis got the contract for the tunnel on competitive bidding and sacrificed workers in an effort to speed its completion. Both Skaggs and Peyton answered his questions in the affirmative. Marcantonio further intimated that the work was speeded up because the Federal Power Commission was claiming jurisdiction over the Hawk's Nest power project, of which the tunnel was part.

George Robinson, negro, who said he worked in the tunnel four months as a drillman, stated that dry drilling was three times faster than wet drilling. He charged that the contractors were in such a hurry to get men back into the heading after blasting that they did not properly scale the top after a shot was made. He said he saw three men killed by falling rock in the heading.

This witness told the subcommittee that although he was suffering from lack of breath and weak spells he did not know what was wrong with him until he heard that men were suing the contractors for sickness alleged to have been contracted in the tunnel. Then he went to Dr. L. R. Harless, doctor for a number of the men suing, who diagnosed his trouble as silicosis also. He said the doctor told him that anyone that had worked in the tunnel more than 24 hours had the disease incurably.

Doctors fail to attend

Dr. Harless has been called by the subcommittee but replied that he could not attend the sessions. Dr. Emery Hayhurst, Columbus, O., also asked to come to the hearings, replied, asking whether his expenses would be paid and what per diem fee would be allowed.

Both witnesses Jones and Robinson testified that a number of law firms in the vicinity of Gauley Bridge and Charleston were soliciting suits from men who had worked in the tunnel. Robinson said that he signed one release without receiving any compensation and then turned his claim over to T. C. Townsend, Charleston, W. Va., lawyer, but was later informed that the statute of limitations prevented action. This lawyer Townsend was identified before the committee as attorney in West Virginia for the United Mine Workers of America.

The witnesses testifying Monday were brought to the committee from their hotel here by men who have previously been identified as connected with the *Peoples Press*, a newspaper published in New York under a Chicago dateline. No member of the committee asked who paid the expenses of the witnesses, although several of them testified that they were now dependent on $2 to $3.50 weekly from federal relief funds to support families.

Last week Philippa Allen, who identified herself as a social worker with the Jacob Riis settlement in New York City, but who also admitted she carried a card of the Federated Press, and who is also connected with the *Peoples Press,* presented testimony, most of which she said was given her by an employee of a law firm representing workers who have sued for compensation for silicosis, that workers had been forced to labor in the silica dust.

Charging that "few of the two thousand men employed during construction of the diversion tunnel will escape silicosis," Miss Allen said that men living in the vicinity of the power project were "still dying like flies in 1934." The witness also alleged that officials of the contractor conspired to violate West Virginia mining laws by dry drilling when state mining inspectors were not around. She said she was told that dry drilling was used almost exclusively except that when the inspectors approached men would warn of their appearance and the dry drilling would be stopped. Men were made to go back into the tunnel immediately after blasting instead of being allowed to remain outside for thirty minutes as allowed by a West Virginia law, Miss Allen asserted, and also that a 24-in. ventilation duct with "only an 18-in. fan" was not put in the tunnel until a state mine inspector forced it. She added that the company did not furnish respirators for the men even though it "knew the danger it was sending these men to face."

Coercion charged

Miss Allen also charged that workers were coerced with the threat of imprisonment if they did not testify for the construction company during the hearings on the compensation suits. Miss Allen described several case histories of men and their families alleged to be suffering from silicosis. She charged further that there was discrimination and abuse against colored workers constructing the tunnel. She declared that men who she said had died of silicosis were buried in a common grave at job rates by an undertaker contracting with the construction company.

Geologists running test bores in preparation for the tunnel found an almost pure deposit of silica and the course of the tunnel was charted and its bore increased from a planned 38 feet to 42 feet to allow this silica to be taken out, the witness stated. She said that this silica, "which was 99.4 per cent pure," was shipped to the Electro-Metallurgical Co. at Alloy, W. Va., and used there without refining.

Under examination by Rep. Jennings Randolph, West Virginia, the witness admitted that the work she did in West Virginia was done on her own initiative and not at all connected with work she did for the Jacob Riis Foundation. Asked how long she stayed in West Virginia, Miss Allen said the month of August in 1934 and one week in 1935. Questioned by Representative Dunn of Pennsylvania concerning her charge that men were driven to work in the tunnel by force, Miss Allen said this story was told her "by some colored men." She admitted that she found no evidence to substantiate this charge in the court records in the compensation cases. Questioned concerning working conditions, Miss Allen said the men worked ten-hour shifts at forty cents an hour but were later dropped to twenty-five cents an hour and at times had to work as high as two hours overtime with no pay for it.

Contractors and WPA Chief Die in Airplane Crash

The crash of an American Airlines' plane, near Goodwin, Ark., on Jan. 14, brought death to two prominent contractors, the WPA administrator for Arkansas and his assistant. Among the passengers who died in the accident were W. S. Hardwick, president of the Hardwick Construction Co., Memphis, Tenn.; D. A. Chernus, also a contractor, Jefferson City, Mo.; W. R. Dyess, WPA administrator for Arkansas; and Robert H. McNair, Jr., WPA director of finance and reports in Arkansas.

Walter S. Hardwick, who was a levee contractor, had just recently been awarded the contract for constructing the main and lateral canals and other appurtenant structures for an irrigation project being carried out with PWA funds, by the Maverick County, Tex., Water Control and Improvement District. Mr. Hardwick was on his way to Eagle Pass, Tex., to take charge of getting the work under way. Mr. Chernus, who was a close friend of Mr. Hardwick, was also en route to Eagle Pass., where, it is understood, he had a subcontract for the concrete work in connection with the irrigation project.

◆

Industrial Council Names Seven Study Committees

On Jan. 6 the Council for Industrial Progress, organized as the outgrowth of the joint industry-and-labor conference conducted on Dec. 9 by George L. Berry, National Coordinator for Industry, held its first meeting. Separate sessions of the management and labor groups followed an opening meeting at which Coordinator Berry suggested methods of procedure. Following the separate meetings the council again met as a whole, and the representatives of the two groups agreed on a list of seven problems to be taken up for initial study.

Each of the seven questions was assigned to a committee made up of four representatives of management and four representatives of labor, appointed by the chairmen of the two groups.

Consumer representatives will be added to these committees by selection from the government consumers' unit, headed by Dr. Walton H. Hamilton.

John G. Paine, of the Music Publishers' Protective Assn., New York, was elected chairman and O. M. Porter, U. S. Pulp Producers' Assn., secretary of the management group. William Green was elected chairman and I. M. Ornburn secretary of the labor group. Sullivan W. Jones was named executive secretary of the council.

◆

City Manager Government Begun in Toledo

Toledo, Ohio, has started off 1936 with the inauguration of its new city manager form of government, to which it gave a good start by retiring a good portion of the scrip which had been issued to pay municipal debts. John North Edy, former city manager for Dallas, Tex., has been selected to head up the new administration in Toledo. Mr. Edy graduated from the University of Missouri in 1905 with a degree of bachelor of science in civil engineering and in 1909 received a graduate degree of civil engineer. After leaving college he spent some time in railroad engineering and then entered public service. In 1918 he became assistant chief engineer for the Montana state highway department and in the following year became chief engineer, holding this position until 1923 when he became city manager of Berkeley, Calif. After seven years as city manager in Berkeley he became city manager at Flint, Mich., for one year and then went to Dallas, Tex.

HYDRAULIC DREDGES are being used to build a fill for the Grand Central Parkway extension at New York, where it passes around Flushing Bay on its way to the Triborough Bridge. Coarse sand from Gravesend Bay, 20 miles away, on the ocean-side of Long Island, is brought into Flushing Bay and dumped in front of the dredges where it mixes with the fine sand of that bay. In the lower left corner is Northern Blvd., under which the new parkway passes, and above that is Astoria Blvd., widened to provide for the parkway connection. The new Triborough is under construction near the upper left corner, to the left of Hellgate Bridge.

Aerial Explorations, Inc.

National Bills of Interest to Engineers

Among the bills of engineering interest that have been introduced in Congress during the past week, is one to repeal the act incorporating the North River Bridge Company and authorizing the construction of a bridge across the Hudson River from New York City to New Jersey. Such a bridge from mid-town New York was long advocated by the late Gustav Lindenthal, and although the bridge was authorized it failed a number of times to receive the approval of the War Department. Another bill would make it a governmental policy to assist in shore and beach erosion protective work, while still other house bills provide for flood control work near Middlesboro, Ky., and on the Arkansas River near Little Rock, Ark.; amendment of HOLC laws to provide extension of time for payment of interest and principle by home owners and the institution of a permanent Civilian Conservation Corps. A joint resolution would grant New Jersey and Pennsylvania the power to create a Delaware River Joint Toll Bridge Commission.

◆

Engineering Foundation Elects Officers

At a recent meeting of the Engineering Foundation, New York City, officers and committees for 1936 were elected and progress was reported in numerous investigations affecting science, engineering and industry. H. P. Charlesworth, assistant chief engineer, American Telephone and Telegraph Co., was reelected chairman; D. Robert Yarnall of the Yarnall-Waring Co., vice-chairman, and Alfred D. Flinn, director and secretary. Among members of the board were George E. Beggs, professor of civil engineering, Princeton University, and Langdon Pearse, sanitary district engineer of Chicago, who were nominated by the American Society of Civil Engineers. A. L. J. Queneau, Otis E. Hovey, George L. Knight, H. P. Charlesworth and D. R. Yarnall were named to the Foundation's Board as representatives of the United Engineering Trustees, joint agency of the four founder engineering societies. New members-at-large include John V. N. Dorr, president of the Dorr Co., New York.

The Foundation's Research Procedure Committee is composed of D. R. Yarnall, L. W. Chubb, F. F. Colcord, F. M. Farmer, Thaddeus Merriman, W. H. Fulweiler, and Alfred D. Flinn. Members of the Cement and Concrete Research Planning Committee include Prof. Raymond E. Davis, University of California, R. W. Crum, R. F. Blanks, A. P. Greensfelder, and Thaddeus Merriman.

◆

Flood Control Survey Planned for Mohawk River

A survey of water resources, pollution and soil erosion in the Mohawk River drainage area, has been authorized by the New York State Planning Council, which has engaged E. S. Cullings, chief engineer of the Black River Regulating District, to direct the preliminary flood control study and to determine the possibility of a statewide survey. Army engineers are now conducting a survey of the area, in the southern counties, that suffered large losses from floods last summer, with a view to making recommendations for future flood control work. The planning council proposes a more general survey to determine necessary flood control. It is believed that if a heavy storm should center over the Mohawk Valley, that extensive damage would result because of the topography of the area.

◆

SOCIETY CALENDAR

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, annual meeting, Chicago, Ill., January 27-30.

AMERICAN WOOD PRESERVERS ASSOCIATION, annual meeting, Memphis, Tenn., January 28-30.

NATIONAL PAVING BRICK ASSOCIATION, annual meeting, Columbus, Ohio, January 29-31.

ENGINEERING INSTITUTE OF CANADA, annual meeting, Hamilton, Ont., February 6-7.

AMERICAN CONCRETE INSTITUTE, annual meeting, Chicago, Ill., February 25-27.

AMERICAN RAILWAY ENGINEERING ASSOCIATION, annual meeting, Chicago, Ill., March 10-12.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting, Atlantic City, N. J., June 29 to July 3.

WEST VIRGINIA SOCIETY OF PROFESSIONAL ENGINEERS, annual meeting, Huntington, January 27-28.

NEW JERSEY SECTION, AMERICAN WATERWORKS ASSOCIATION, waterworks session, Trenton, January 29.

NEW YORK BUILDING CONGRESS, Luncheon meeting, New York City, guest speaker SEN. ROBERT F. WAGNER, January 30.

ASSOCIATION OF HIGHWAY OFFICIALS OF NORTH ATLANTIC STATES, annual meeting, Atlantic City, N. J., February 12-14.

MINNESOTA SURVEYORS AND ENGINEERS SOCIETY, Minneapolis, February 20-21.

MINNESOTA FEDERATION OF ARCHITECTURAL AND ENGINEERING SOCIETIES, Minneapolis, February 21-22.

SOUTHWEST ROAD SHOW AND SCHOOL, Wichita, Kan., February 25-28.

AMERICAN SOCIETY FOR TESTING MATERIALS, regional meeting, Pittsburgh, Pa., March 4, and meetings of committees, March 2-6.

◆

Personals

LOWELL O. STEWART has been appointed personnel officer for the division of engineering, Iowa State College, and will supervise all personnel work in this division. Prof. Stewart has been associate professor of civil engineering at Iowa State College and one of the junior college counsellors on the personnel staff. He received the degree of bachelor of science in civil engineering from Michigan State College in 1917, his master of science from Iowa State College in 1927 and his professional degree in 1928.

EDWIN M. WHIPPLE, assistant construction superintendent, at Pickwick Landing Dam, has been promoted to construction superintendent of Chickamauga Dam. Among the projects on which Mr. Whipple has supervised construction are the Pardee Dam, Calif., Eleven Mile Canyon Dam, Denver, Colo.

EMIL SCHRAM, chief of the drainage, levee and irrigation division of the Reconstruction Finance Corp., has been elected to succeed Morris L. Cooke as president of the Electric Home and Farm Authority. Mr. Cooke, who is also administrator for the Rural Electrification Administration, recently resigned as president of the Electric Home and Farm Authority in order to give his undivided attention to the REA.

GEORGE P. JESSUP, construction superintendent at Wheeler Dam on the Tennessee River, has been appointed construction superintendent of Guntersville Dam, which is being built by the TVA. Mr. Jessup is a graduate engineer from Cornell University and among other projects has supervised construction on Baker River Dam for the Puget Sound Power & Light Co., Conowingo project on the Delaware River, and the Osage power development at Bagnell, Mo.

◆

Obituary

FRANK H. WHITING, 78, contracting engineer of Denver, Colo., died in Seattle, Wash., on Jan. 3.

ALFRED ROWLAND ASTON, an engineer for the Muskingum Conservancy District, died at his home in New Philadelphia, Ohio, Jan. 8, at the age of 44.

JOHN W. STANSELL, former Memphis levee contractor connected with the Corps of Engineers died recently at Baton Rouge, La. He was 63 years of age and was an executive of the Roach and Stansell Co., Memphis.

WATTS D. GARDNER, assistant superintendent of lighthouses, Buffalo, N. Y., died on Jan. 4, at the age of 69. Mr. Gardner graduated as civil engineer from Columbia University in 1888. He entered the Lighthouse Service in 1900 and has been with the service continuously since then.

FRANK P. MORRISON, 66, for many years engaged in the building industry of Buffalo, N. Y., died in that city, Jan 14.

RICHARD S. STEUART, 87 years of age, an engineer who worked on the construction of the old Loch Raven dam near Baltimore, Md., died on Jan. 10.

LUDLOW L. MELIUS died in Warren, Conn., on Jan. 14, at the age of 61. Mr. Melius had lived in Connecticut since retiring from engineering 20 years ago, and in 1931 and 1933 was a member of the Connecticut state legislature. He had studied engineering at Union College and then spent two years on engineering and construction work with the Tivoli Hollow R.R. He later spent a number of years on dam and road engineering and was at one time in charge of building aqueducts on the Champlain Canal.

HOLLIS GODFREY, consulting engineer of Boston and who, in 1913, was elected president of Drexel Institute, Philadelphia, died at his home in Duxbury, Mass., Jan 17, at the age of 61. Mr. Godfrey, who in late years was a contributor to many technical and other magazines, held doctorates in laws and science. He was graduated from Tufts College in 1895 and during later years studied at Harvard, Massachusetts Institute of Technology, Miami University, and Queen's University and Bishop's College in England. Dr. Godfrey was, from 1906 to 1910, head of the department of science of Boston School of Practical Arts and for the next seven years was consulting engineer to the Iowa Survey making a study of health conditions in Philadelphia and Atlantic City.

WALTER S. RAY, for many years a prominent figure in the New England construction field, formerly manager for the J. B. King Co., and later connected with the U. S. Gypsum and Atlantic Gypsum companies, died at Brookline, Mass., on Jan. 13, at the age of 72.

WARREN M. KING, treasurer of the Norwood Engineering Co., and for the past twenty years water commissioner of Northampton, Mass., died in that city on Jan. 14 after a long illness. He was born in Greenfield, Mass., 79 years ago.

FREDERICK W. SALMON, 69, chief engineer of Hardie-Tynes Manufacturing Co., Birmingham, Ala., died early this month. A native of England, he began his engineering career in the British navy. He was a member of the Birmingham Engineers Club and of the American Society of Civil Engineers.

JAMES RAYMOND BURPEE, a civil engineer, of South Devon, N. B., died recently at the age of 49. He was graduated in engineering from the University of New Brunswick. Later he became attached to the New Brunswick department of public works, as engineer in charge of the construction of an international bridge over the St. John River at Edmundston, N. B., and Madawaska, Me. At the time of his death he was superintending construction of an extension to the Grand Lake power plant of the New Brunswick Electric Power Commission. Simultaneously he had been directing a coal stripping operation in the Grand Lake soft coal mining district.

FRANCIS HENRY KNOX, street railway engineer, of Mount Pleasant, S. C., died Jan. 15, in Spartanburg, S. C. Mr. Knox, a graduate of the University of Pittsburgh, was one of the engineers on electrification of the Charleston, S. C., street railway system. He was also engineer in charge of the line to the Isle of Palms. Later, he worked for the street railway companies in Columbia and Spartanburg.

CONSTRUCTION STATISTICS FOR THE WEEK

ENGINEERING construction awards for this week total $45,543,000 which is lower than the two preceding weeks. Private awards, however, are the highest this year. The total is made up of private, $17,047,000; public, $28,496,000; federal, $4,305,000; state and municipal, $24,191,000. Corresponding values last year are: total, $25,295,000; private, $5,819,000; public, $19,476,000; federal, $7,344,000; state and municipal, $12,132,000.

Industrial buildings at $4,866,000, commercial buildings at $4,150,000 and private unclassified at $7,738,000 have all taken a sharp rise. All classes of public work are lower than last week, waterworks at $1,839,000; sewers at $1,730,000; bridges at $2,718,000; streets and roads at $7,403,000; and buildings at $10,946,000.

The larger awards include: factory for General Dyestuffs Corporation, New York City, $1,500,000; polymerization unit for Atlantic Refining Co., Beaumont, Tex., $1,500,000; school, Watervliet, N. Y., $714,000; senior high school, Westerly, R. I., $405,000; county building and jail, Kalamazoo, Mich., $590,000; two buildings at State Hospital, Cranston, R. I., $510,000; highways by Alabama, $513,000; by Kansas, $450,000; by Ohio, $411,000; in Virginia by Federal Bureau Public Roads, $1,141,000; paving East River Dr. from 92nd to 124th St., New York, part of Triborough Bridge Project, $579,000; 5,100,000 cu.yd. levee work in West Atchafalaya Basin Levee, Louisiana, for U. S. Engineers, $1,831,900; rails, roadbed and improvements to lines of Western Pacific R.R. in California, Utah and Nevada during 1936, $3,700,000; 74,526 tons of steel rails for Atchison, Topeka & Santa Fe Ry., Topeka, Kan., estimated to cost $2,608,000; 375 mi. transmission lines and 1,600 mi. distribution lines for Niagara, Lockport & Ontario Power Co., near Medina, N. Y., $1,000,000.

New capital for the week includes state and municipal bonds sales $9,616,000, corporate issues $265,000, and a non-federal PWA loan and grant of $2,000,000. The RFC sold 38 issues of bonds which it had purchased from the PWA. The face amount of the bonds was $4,472,800 and the sale price $4,657,813.39.

CONTRACTS

(Thousands of Dollars)

	Weekly Average Jan. 1935	Prev.4 Weeks	Week Jan.23 1936
Federal Government	$3,979	$15,224	$4,305
State and municipal	15,399	44,576	24,191
Total public	$19,378	$59,800	$28,496
Total private	5,977	4,773	17,047
Week's total	$25,355	$64,573	$45,543

Cumulative to date:
1935...$123,342,000 1936...$239,527,000

NEW PRODUCTIVE CAPITAL

(Thousands of Dollars)

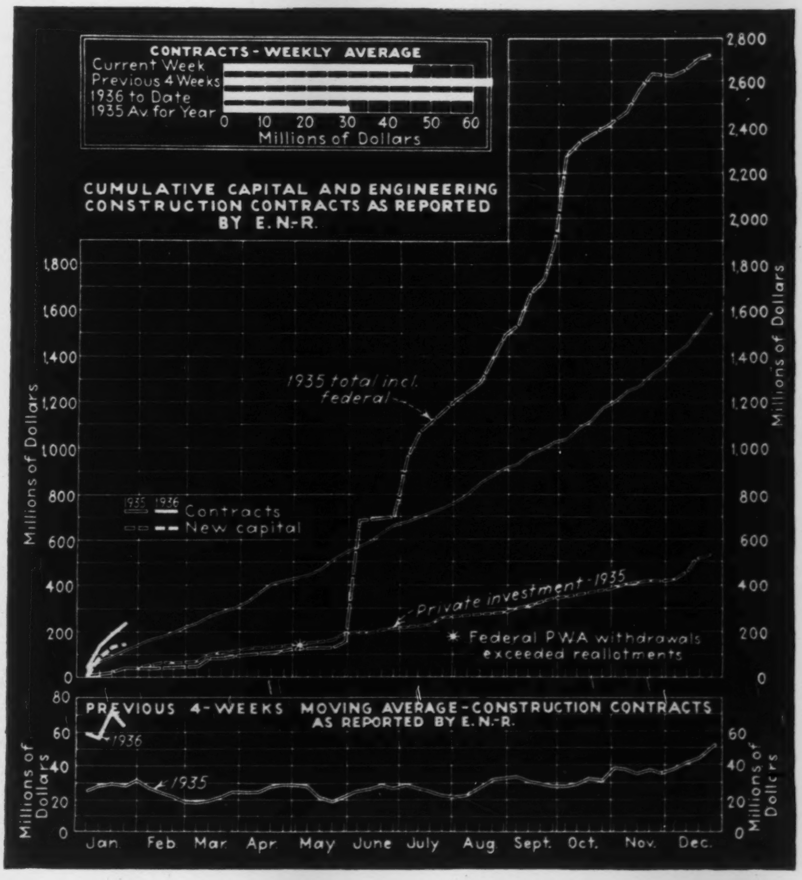
1936	Week Jan.23	Cumulative
State and municipal...	$9,616	$44,148
PWA non-federal	2,000	65,046
RFC loans	....	25,000
Corporate issues	265	12,393
Total Non-Federal...	$11,881	$146,587
Federal	....	64
Total new capital.....	$11,881	$146,651

Cumulative to date:
1935....$32,000,000 1936....$146,651,000

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for federal construction, deficiency act funds. An arbitrary percentage (25%) of the WPA allotments and local contributions to WPA work is included to allow for the capital additions through the Works Progress Administration division of the new program.

INDEX NUMBER

ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
Jan., 1936...	**199.48**	**95.89**	**Dec., 1935...**	**254**	**111**
Dec., 1935...	194.90	93.69	Nov. 1935...	171	75
Jan., 1935...	198.72	95.52	Dec. 1934...	105	46
1935 (Av.)...	195.22	93.84	1935 (Av.)...	135	58
1934 (Av.)...	198.10	95.23	1934 (Av.)...	114	50
1933 (Av.)...	170.18	81.80	1933 (Av.)...	102	47



Construction Equipment and Materials

Continuous Reproduction With Blue-Print Machine

An inexpensive blue-printing unit, Model 7, has been introduced by the C. F. Pease Co., Chicago, Ill., to meet the demand for continuous reproduction. The unit will reproduce in blue-prints, brown-prints or direct process prints up to 42 in. in width.

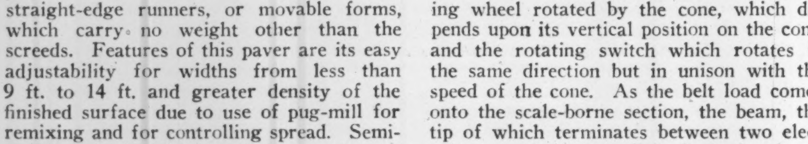
Tracings and sensitized paper are carried on an endless belt through the machine in close contact with the plate glass where the exposure takes place. Tracings and reproductions are then returned to a tray, conveniently placed so as to be available for repeat feeding. Uniform illumination is provided by 3½ amp., 50-in. mercury vapor lamps, giving sufficient light for printing speeds up to 2½ ft. per minute. The unit has a variable speed motor which operates on a circuit of 20 amp. at 110 volts.

◆

Self-Propelled Paver Increases Paving Speeds

For laying low-cost roads with all types of plant-mix materials, both hot and cold, the self-propelling bituminous paver, manufactured by the Jaeger Machine Co., Columbus, Ohio, and illustrated below, employs the principle of long, equalizing straight-edge runners, or movable forms, which carry no weight other than the screeds. Features of this paver are its easy adjustability for widths from less than 9 ft. to 14 ft. and greater density of the finished surface due to use of pug-mill for remixing and for controlling spread. Semi-crawler wheels, with greatly increased traction, permit up to 35 ft. per minute finishing speeds without rutting or tearing of the surface which in turn allows bigger capacity, up to 1,000 tons a day, due to this high working speed and the ability to lay wider lanes. Maximum traction for speed and grades is insured by the fact that all four wheels operate on hard subgrade. Only the runners and screeds touch the newly laid material, eliminating slipping and tearing of new surface.

Economies of operation are effected by one-man control with differential steering and less need for joint work or labor back of the machine due to its ability to blend center joints, and lay material flush to curb.



◆

Scale for Weighing Conveyor Loads

Continuous weighing of conveyor loads has been developed by Fairbanks, Morse & Co., Chicago, Ill., which now makes a conveyor feeder scale available in complete self-contained units of any desired width and in lengths from 8 ft. to 30 ft. For the usual belt conveyor a suitable frame and means for suspending a section of the belt and integrating mechanism is furnished.

The integrating mechanism consists of a cone and rotating switch driven by a flexible shaft, an integrating wheel mounted on a hollow shaft and driven by the cone, and a reversible motor with a pinion gear which engages a rack which raises or lowers the integrating wheel. The integrating of the weight is effected by the differential in speeds between the integrating wheel rotated by the cone, which depends upon its vertical position on the cone, and the rotating switch which rotates in the same direction but in unison with the speed of the cone. As the belt load comes onto the scale-borne section, the beam, the tip of which terminates between two electric contacts, rises until it closes the circuit at the upper contact. This starts the reversible motor in the proper direction to raise the integrating wheel on the face of the cone, increasing its speed above that of the rotating switch which remains constant and in unison with the cone. Although the load on the belt may vary considerably, the beam responds quickly, contacting in either direction to cause the reversible motor to shift the integrating wheel to a position on the face of the cone where its speed will be proportional to the load on the scale.

◆

New Equipment in Brief

Welding Generator on Motor Truck. A power take-off developed by the Hercules Steel Products Co., Galion, Ohio, in conjunction with the Lincoln Electric Co., Cleveland, makes it possible to equip a standard 1½ ton truck with an arc welding generator. This unit, which will transmit 120 brake hp. at 2,800 r.p.m., lends greater portability to either a 200 or 300 amp. generator when used by pipe line contractors, steel erectors and others to whom portability of equipment is a necessity.

Gear Motors. Gear motors of fractional horsepower for direct connection to agitators, conveyors, low-speed pumps or mixers are being made by the Wagner Electric Corp., St. Louis, Mo. These gear motors are available in single, double or triple-reduction types with either right angle or parallel shaft drive, delivering power at speeds as low as 6 r.p.m.

◆

New Publications

INSTRUCTIONS AND RECOMMENDATIONS FOR LE TOURNEAU OPERATORS, R. G. Le Tourneau, Inc., Peoria, Ill. 8½x11, 7 pages.

AN ANALYSIS OF PLANT CONDITIONING, Sherwin-Williams Co., Cleveland, Ohio. 8½x11, 34 pages. Save-Lite paint.

BIG B DETACHABLE BIT GRINDER, J. G. Blount Co., Everett, Mass. 8½x11, 4 pages.

ALLEGHENY STAINLESS STEEL, Joseph T. Ryerson & Son, Inc., Chicago, Ill. 11x14, 8 pages.

KAWNEER STORE FRONT CONSTRUCTION, Kawneer Co., Niles, Mich. 8½x11, 6 pages.

P. F. T. FLAME TRAPS, Pacific Flush-Tank Co., Chicago, Ill. 8½x11, 15 pages. Elimination of explosion hazards in sewage digesters.

ABRASION RESISTING STEEL, Carnegie-Illinois Steel Corp., Pittsburgh, Pa. 8½x11, 10 pages.

HIGH INTENSITY MERCURY VAPOR LAMP FIXTURES, Benjamin Electric Mfg. Co., Des Plaines, Ill. 8½x11, 28 pages.

DIESEL ELECTRIC GENERATOR SETS, Caterpillar Tractor Co., Peoria, Ill. 8½x11, 7 pages.

THE STRENGTHENING OF AN L. M. S. RAILWAY BRIDGE, Canadian Sheet Piling Co., Ltd., Montreal, Can. 8½x11, 5 pages.

AGATHON ALLOY STEELS, Republic Steel Corp., Massillon, Ohio. 6x9, 105 pages.

◆

Business Notes

OWENS-ILLINOIS GLASS CO., Toledo, Ohio, has appointed William C. Davis, formerly of the U. S. Gypsum Co., as director of merchandising for industrial and structural materials. Mr. Davis, who studied civil engineering at the University of Kentucky, has spent a number of years in railroad, irrigation and structural engineering.

INLAND STEEL CO., Chicago, Ill., has transferred Davis S. Wright, formerly with the department of inspection and metallurgy, to the sales department.

HARNISCHFEGER CORP., Milwaukee, Wis., has appointed R. L. Mead as manager of the corporation's Chicago office.

THE TORRINGTON CO., Torrington, Conn., and its subsidiary, The Bantam Ball Bearing Co., South Bend, Ind., announce the appointment of A. S. Hellstrom as manager of the Cleveland, Youngstown, Akron and Wheeling districts with offices in Cleveland.

CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

★ **Ala., Birmingham**—City, J. M. Jones, Jr., pres. City Comn., plans industrial water supply system, incl. 180x1,000 ft. masonry dam, 21,850 m.g.c. reservoir, fireproof pumping station about 1½ mi. southeast of Inland, on Blackburn Fork of Black Warrior River, 15 mi. 60 in. pipe line to distribution reservoir about 1½ mi. southeast of Mt. Pinson, concrete lined earth dams, 120 m.g.c., alkalinity and denaturing plant, 16- to 60-in. pipe line from distribution reservoir through Ketona, Tarrant, Boyles, North Birmingham, Thomas, Ensley, Fairfield, Wylam, Dolomite and Woodward; 31 mi. 60 in. pipe, 45 mi. pipe less than 60 in., 195,000 cu.yd. masonry in dams, 598,000 cu.yd. excav. Total cost $5,808,000. W.P.A. appropriated $2,378,000 to construct with W.P.A. labor a rock quarry and plant, distribution reservoir and distribution lines. P.W.A. appropriated $3,430,000 to construct by P.W.A. contracts impounding dam, clearing sites, pump house and supply lines. Engineering Com., c/o J. D. Webb, chn., City Hall, engrs.

Calif., Maxwell—See "Sewerage and Waste Disposal."

Ind., Ashley—Town Bd., C. Deetz, chn., soon takes bids constructing waterworks system, incl. 10 in. deep well, turbine type deep well pumping unit, 65,000 gal. elevated steel tank, pump house, distribution system, c.i. mains. $90,000. Lennox & Matthews, 537 Architects Bldg., Indianapolis, engrs. P.W.A. project. Noted Sept. 20, C. D.—Sept. 26, E. N.-R.

La., New Orleans—Sewerage & Water Bd. rejected bids Dec. 5, furnishing labor and material on percentage basis for waterworks, sewerage and drainage construction for year 1936. Sewerage & Water Bd., engrs. Noted Oct. 14, C. D.—Oct. 17, E. N.-R.

Mass., Cambridge—City, Water Dpt., indefinitely postponed taking bids for waterworks improvements. $150,000. Money not appropriated for same. C. M. Everett, 220 East 40th St., New York, engrs. Noted Sept. 27, C. D.—Oct. 3, E. N.-R.

Mass., Yarmouth — Town, Bd. Selectmen, Town Hall, will not construct water supply system. $200,000. Project voted down. Whitman & Howard, 89 Broad St., Boston, engrs. Noted Oct. 2, C. D.—Oct. 10, E. N.-R.

N. Y., Glens Falls—City, bids early in spring, constructing rein.-con. dam, pumping station and equipment. $144,000. $74,700 P.W.A. allotted.

O., Toledo—See "Unclassified."

Tex., Pear Ridge—City, c/o J. A. Kirkland, mayor, soon takes bids waterworks system, incl. distributing lines, steel tank and tower, 100,000 gal. capacity, pumping unit, deep well, etc. $30,155. Voted $20,000 bonds. $10,155 W.P.A. grant. Engineer, c/o City. Noted Sept. 27, C. D.—Oct. 3, E. N.-R.

Tex., Sherman—See "Public Buildings."

Wash., Everett—City orders cost estimates prepared for (1) laying new pipe line over existing right-of-way to city's water source, Lake Chaplain, or (2) installing pumping plant on Snohomish River at Lowell to furnish water for industrial purposes. G. G. Paine, City Hall, engr.

Wash., Tacoma—City soon takes bids constructing Sect. T, Green River gravity water line. W. A. Kunigh, City Hall, water supt.

BIDS ASKED

Calif., San Francisco—Feb. 4, by P. Utilities Comn., City Hall, laying 36 in. and 44 in. steel crosstown pipe line, installing 77,000 lb. fittings, replace pavements, etc. N. A. Eckart, 425 Mason St., engr.

Calif., San Francisco—Feb. 5, by P. Utilities Comn., City Hall, constructing Crystal Springs Pipe Line 2, 10.5 mi. pipe line to be constructed, greater portion laid in trench and approximately 0.5 mi. supported above ground on timber trestle or concrete piles; bids will be taken on 2 sections, Sect. A, from point near Baden to University Mound Reservoir, 35,050 ft. entirely 60 in. welded steel pipe, ⅜ in. plate; Sect. B, from point of beginning near Millbrae to point near Baden, 20,540 ft. of 60 in. steel cylinder rein.-con. pipe with short sections of 60 in. welded steel pipe, ⅜ in. plate. N. A. Eckart, 425 Mason St., engr. Noted Dec. 3, C. D.—Dec. 5, E. N.-R.

Conn., Niantic — Jan. 27, by Quartermaster General, State Armory, Hartford, water system at State military reservation, incl. watermains and appurtenances. $20,000. Blair & Marchant, Inc., 100 Crown St., New Haven, engrs. Noted Jan. 13, C. D.—Jan. 20, E. N.-R.

Ind., Yorktown—Town Bd., H. Watkins, clk., taking new bids waterworks, incl. two 10 in. deep wells, chlorination equipment, 50,000, 60,000 or 75,000 gal. ellipsoidal bottom type elevated steel storage tank, 100 ft. high, c.i. steel or bolted mains, 17,045 lin.ft. 2- to 8-in. pipe, 21 fire hydrants, 6 in. connections, 4 fire hydrants, 4 in. connections, three 8 in. and fifteen 6 in., fifteen 4 in. and eleven 2 in. valves and boxes, brick, rein.-con. pump house. $40,000. P.W.A. project. Bids Dec. 12 rejected. R. B. Moore & Co., Inc., 930 Indiana Pythian Bldg., Indianapolis, engrs.

Ill., Chandlerville — Feb. 4, by Village, J. Haier, pres., waterworks. Caldwell Eng. Co., Jacksonville, engrs. P.W.A. project.

Ill., Cicero — Jan. 31 (extended date), by Town, J. G. Cerny, mayor, constructing waterworks. P.W.A. project. C. DeLeuw & Co., 20 North Wacker Dr., Chicago, engrs. Noted Jan. 3, C. D.

La., New Orleans—Mar. 10, by Sewerage & Water Bd., furnishing labor and material on percentage basis, for waterworks, sewerage and drainage construction. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

Mich., Detroit—Jan. 28, by Bd. Water Comn., Water Board Bldg., 735 Randolph St., furnishing, delivering, installing additional flow meters, water level gages and clocks at Springwells Station D, No. PS-203. G. H. Fenkell, Detroit, engr.

Mo., Excelsior Springs—See "Public Buildings."

†Mo., Kansas City—U. S. Eng., 232 Mfg. Exch. Bldg., taking bids distilling plant for fresh water to supply 300-400 gal. fresh water per day; filtering medium, animal bone charcoal with spherical valve steam tap, automatic feed control, aerating pipe, blow-off valve, water gage, pressure gage, drain valve.

N. Y., Apalachin—Village taking bids constructing water system. Nussbaumer & Clarke, 327 Franklin St., Buffalo, engrs. Noted Dec. 3, C. D.—Dec. 12, E. N.-R.

N. Y., Frankfort—See "Contracts Awarded."

N. Y., Westfield—See "Contracts Awarded."

O., Cincinnati—Jan. 29, by City Purchasing Agent, furnishing, laying suction and discharge mains at Western Hill Station, incl. special castings 56 tons and incinerator work. P.W.A. project. Bids Nov. 29 rejected. Noted Dec. 11, C. D.—Dec. 19, E. N.-R.

Wis., Milwaukee—Feb. 4, by Dpt. P. Wks., constructing concrete conduits, sludge shafts and water purification plant. R. E. Stoelting, comr.

CONTRACTS AWARDED

Colo., Fort Collins—City Council, replacing 6,000 ft. wood stave watermain with c.i. pipe, to Schwartz Constr. Co., 25 East Bijou St., Colorado Springs, $42,435.

Ga., Augusta—City, constructing 500,000 gal. elevated steel tank, to Chicago Bridge & Iron Co., Birmingham, Ala., $44,800. Est. $45,000. **P.W.A.** Bids Nov. 16, awarded Jan. 6. Noted Oct. 31, C. D.—Nov. 7, E. N.-R.

Ga., Coolidge—City, waterworks system, Sect. A, to Barlow Cordy Constr. Co., Columbus, $7,218***Sect. B, to W. R. McGrew, Thomasville, $1,115***Sect. C, to Taylor Iron Wks. & Supply Co., Macon, $5,900. Grand total $14,233. Est. $15,000. **P.W.A.**

Ga., Darien — City, City Hall, constructing water supply system, incl. c.i. mains, hydrants, meters, valves, chlorinator, etc., to Hull Constr. Co., Savannah, $25,095. Est. $25,693. **P.W.A.** Bids Dec. 3, awarded Jan. 2. Noted Nov. 22, C. D.—Nov. 28, E. N.-R.

Ga., Forsyth—City, constructing waterworks system, Contr. 1, to R. A. Bowen, Macon, $35,648. Est. $63,593. **P.W.A.** Noted Dec. 9, C. D.—Dec. 12, E. N.-R.

Ga., Palmetto—J. B. McCrary Co., engrs., 22 Marietta St., Atlanta, c/o J. A. Dennis, mayor, Palmetto, waterworks system, incl. water softening plant, c.i. mains, hydrants, meters, etc., to Carter Constr. Co., Geneva, Ala., $45,265. Est. $50,000. **P.W.A.** Bids Dec. 10, awarded Jan. 6. Noted Dec. 6, C. D.

Ga., Statham—City Clerk, City Hall, constructing water system, to Hornbuckle & Co., Atlanta, $17,665. Est. $18,181. **P.W.A.** Noted Nov. 19, C. D.—Nov. 21, E. N.-R.

Ga., Sylvania—City, constructing deep well for water supply, to J. R. Connelly, Varnville, S. C., $4,100. Est. $6,363. **P.W.A.** Bids Dec. 2, awarded Jan. 9. Noted Jan. 15, C. D.—Nov. 28, E. N.-R. (**Correction**—Contract Awarded, not low bidders.)

Ga., Thunderbolt—City, waterworks system, Contr. 1, to J. B. McCrary & Co., 22 Marietta St., Atlanta, $26,981. Est. $42,842. Awarded Jan. 9. Noted Aug. 22, C. D.—Aug. 29, E. N.-R.

Idaho, MacCammon — City, replacing wood pipe supply line with 25,700 lin.ft. 6 and 8 in. c.i. pipe, to Olson Constr. Co., Boise, $8,946 ***furnishing pipe, to Waterworks Equipment Co., 59 West 2nd St. S., Salt Lake City, Utah, $24,605. Bids Dec. 28. Noted Jan. 16, C. D.

Ill., Aurora—City, 4 m.g. ground level reservoir, to Thomas McQueen, 1313 Circle Ave., Forest Park, $124,175***4 equipment units for new deep well, to American Well Wks., Aurora, $12,294***5th unit of well, to Aurora Pump Co., 32 West Van Buren St., Chicago, $6,748 ***general contract pumping station Fox River, to Continental Constr. Co., 340 North Central Ave., Chicago, $68,580***electric wiring and fixtures for pumping station, to Wadeford Electric Co., 205 West Wacker Dr., Chicago, $24,400***plumbing, to Meyer & Reveall, Aurora, $10,995. Grand total $247,192. **P.W.A.** Bids Dec. 23. Noted Dec. 18, C. D.

Section Index

Engineering Structures:

Bridges and Grade Crossings 50
Earthwork, Irrigation, Drainage and Waterways 54
Foreign 57
Materials and Equipment 56
Streets and Roads 52
Sewerage and Waste Disposal 49
Unclassified 55
Waterworks 47

Buildings:

Public 57
Commercial 60
Industrial 61

Projects $500,000 and over symbol ★
Reports noted back to former issues are designated as follows:
C. D. Construction Daily
E. N.-R. Engineering News-Record.
Federal Government projects symbol †

◆

Ia., Ames—City Council, constructing and erecting 500,000 gal. water tank and removing old tower, to Pittsburgh-Des Moines Steel Co., 1015 Tuttle St., Des Moines, $16,498 and $1,250 respectively***concrete foundations, to F. Fischer, Ames, $2,248. Grand total $19,996. **P.W.A.** Bids Jan. 6. Noted Jan. 2, C. D.

Ia., Larchwood—Town Council, watermains, to C. W. Rowland, Des Moines, $12,264*** tank and tower, to Pittsburgh-Des Moines Steel Co., 1015 Tuttle St., Des Moines, $7,027*** well, to Rasmussen Bros. Well Co., 3604 4th Ave., Sioux City, $1,035***turbine, to Fairbanks Morse Co., 900 South Michigan Ave., Chicago, Ill., $931. Grand total $21,257. Est. $25,000. **P.W.A.** Bids Dec. 7.

Me., Falmouth—Portland Water Dist., Casco St., Portland, furnishing, laying about 20,000 ft. 8 in. c.i. pipe line from Colley's Corner to West Falmouth Rd., to John MacDonald Constr. Co., 215 California St., Newton, $76,530. Bids Dec. 11, awarded Jan. 9.

Mich., Wyandotte — Dpt. Municipal Service, waterworks improvements, incl. screen chamber, screens and connections, condenser and filtered water storage reservoir, to Bennage & McKinstrie Co., 4612 Woodward Ave., Detroit, $38,506. **P.W.A.** Bids Dec. 9. (**Correction**—contractor's name.) Noted Dec. 17, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

Neb., Arcadia—City, tank for waterworks, to Omaha Steel Wks., 48th and Leavenworth Sts., Omaha, $6,200***valves and pumps, to Interstate Mchy. & Supply Co., 1006 Douglas St., Omaha, $7,189***pipe, to McWane Cast Iron Pipe Co., Dierks Bldg., Kansas City, Mo., $2,716***pipe line labor, to J. F. Sears, Callaway, $1,257***gravel well, to Johnson & Butterfield, Burwell, $1,700. Grand total $19,062. Est. $13,755. **P.W.A.** Bids Nov. 8. Noted Nov. 21, C. D.

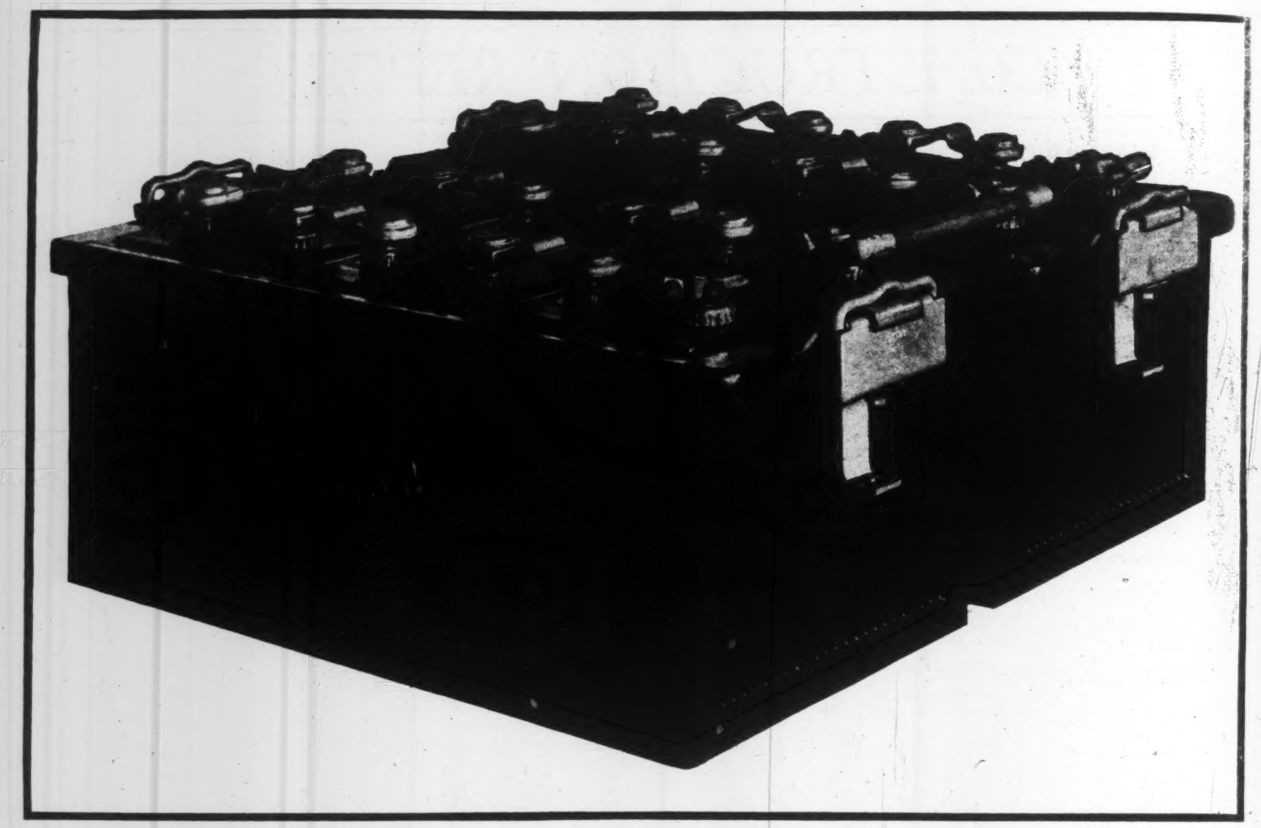
Neb., Howard City—City, standpipe for waterworks, standpipe, to Drake, Williams & Mount, 24th and Hickory Sts., Omaha, $2,410; pipe and specials, to U. S. Pipe & Fdry. Co., Bryant Bldg., Kansas City, Mo., $4,500. Est. $19,995. Bids Dec. 13. Noted Jan. 3, C. D.

Neb., Loomis—City, steel tank on tower for waterworks, to Omaha Steel Wks., 48th and Leavenworth Sts., Omaha, $5,425***pipe, to American Cast Iron Pipe Co., 2930 North 16th St., Birmingham, Ala., $5,421***pipe line labor, to J. R. Martz, Seward, $3,590***pump house, to W. L. Johnson, Loomis, $497***service pipe, to A. Y. McDonald Mfg. Co., 1201 Dodge St., Omaha, $373***hydrants and valves, to Interstate Mchy. Supply Co., 1006 Douglas St., Omaha, $860. Grand total $16,165. **P.W.A.** Bids Dec. 13. Noted Jan. 2, C. D.

Neb., Prague—City, c.i. pipe, to U. S. Pipe & Fdry. Co., Bryant Bldg., Kansas City, Mo., $4,642***hydrants and valves, to O. C. Matons, Prague, $792***tubular well, to H. H. Brown, Blair, $930***pump, to Interstate Machine & Supply Co., 1006 Douglas St., Omaha, $912. Grand total $7,276. **P.W.A.** Bids Dec. 13. Noted Dec. 6, C. D.

---

†*Federal Government.*



THE RIGHT BATTERY MAKES DIESELS AS EASY TO START AS YOUR CAR

Exide has long given special attention to the subject of starting high-speed Diesels electrically. We are familiar with the special requirements of the various makes and types of Diesels—two-cycle, and four-cycle, with various injection systems, cylinder designs and operating speeds. We are in a position to recommend the type of Diesel starting battery that will do the most efficient and economical job on your equipment.

The Exide Batteries for this purpose have been especially designed to deliver the high voltage needed for high cranking speeds—and to deliver this voltage at high rates of discharge at low temperatures, with no sacrifice of the dependability, long life and economy for which Exides are famous.

Exide Engineering Service, backed by our broad Diesel experience, offers an intelligent analysis of your requirements, and dependable recommendations as to the size and type of Exide for your equipment. This service is free. Why not get in touch with us now?

THE ELECTRIC STORAGE BATTERY CO.
Philadelphia . . . *The World's Largest Manufacturers of Storage Batteries for Every Purpose*
Exide Batteries of Canada, Limited, Toronto

Exide

BATTERIES

FOR STARTING DIESEL ENGINES

Constr. News page 48

Mcanne ml Lev

Waterworks (Continued)

Neb., **Stella**—City, brick pump house for waterworks, to C. M. Harrison, Steele, $721 ***tubular well, to H. H. Brown, Blair, $798 ***hydrants, valves, boxes, to Iowa Valve Co., 701 Hubbell Bldg., Des Moines, Ia., $2,073*** tank and tower, to Omaha Steel Wks., 609 South 48th St., $5,800. Grand total $9,392. Est. $28,814. **P.W.A.** Noted Dec. 19, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

Neb., **Swanton** — City, waterworks improvements, tank and tower, to Omaha Steel Wks., 609 South 48th St., Omaha, $4,250. **P.W.A.** Bids Jan. 16. Noted Jan. 6, C. D.—Nov. 28, E. N.-R.

N. J., **Seaside Heights**—Boro, waterworks, Contr. A, 45,000 B. M. creosoted yellow pine timber and Contr. C, 450 ft. creosoted yellow pine piling, to Republic Creosoting Co., Money Point, Norfolk, Va., $2,424 and $2,328 respectively***Contr. B, 30,000 B. M. untreated spruce lumber, to C. K. Parry Co., Real Estate Trust Bldg., Phila., Pa., $1,079***Contr. D, gal. wrought iron bolts, head and nuts and Contr. E, pulling up old piling and driving new ones, to T. Proctor Co., 218 5th Ave., Long Branch, $450 and $3,630 respectively. Grand total $9,961. **P.W.A.** Remington & Goff, 509 Cooper St., Camden, engrs.

N. Y., **Carmel**—Town, furnishing, delivering c.i. pipe, to R. D. Wood Co., 129 McKean St., Pittsburgh, Pa.***valves, to Levison & Peiffer, 120 North James St., Peekskill***hydrants, to A. P. Smith Mfg. Co., 545 North Arlington Ave., East Orange, N. J.***installation, to Camarco Contractors, Inc., 11 Mohegan Rd., Ossining. Est. $32,727.

N. Y., **Frankfort**—Village, filtration plant addition and repairs to existing plant, relief labor. $15,000. **W.P.A.** Materials to be purchased by D. Mahoney, Hotel St., Utica, procurement officer W.P.A. Noted Aug. 16, C. D. —Aug. 22, E. N.-R.

N. Y., **Long Island City**—Dpt. Water Supply, Gas & Electricity, Municipal Bldg., New York, furnishing, delivering, driving piles, constructing pile cluster of same and furnishing, delivering, placing, crushed limestone for protection of 30 in. submerged watermain at bridge over Beach Channel, Jamaica Bay Blvd., to F. Movizzo & Co., 1554 75th St., $3,789. Noted Dec. 27, C. D.

N. Y., **Westfield**—Village, constructing waterworks, day labor. $54,000. **W.P.A.** Noted Aug. 6, E. N.-R.

N. C., **Lucama**—Town, general contract Sects. 3 and 4, distribution system, to J. B. McCrary & Co., 22 Marietta St, Atlanta, Ga., $49,856*** wells, to Sydnor Pump & Well Co., Richmond, Va., $1,110***Sect. 2, tanks, to R. D. Cole, Newman, Ga., $6,144. Grand total $57,110. P.W.A. Noted Jan. 6, C D.

N. C., **Whitakers**—Town, constructing complete water and sewerage system, to Lackawanna Constr. Co., 1409 Butler St., Columbia, S. C., $61,912; digging well, to Virginia Mchy. & Well Co., 1319 East Main St., $3,414. Est. $74,545. P.W.A. project. Noted Dec. 9, C. D. Dec. 12, E. N.-R.

S. C., **Charleston**—Comrs. P. Wks., replacing old wooden water mains and extending mains along eastern waterfront, to A. G. Pinkston & Co., Norfolk, Va., $182,632. **P.W.A.** Noted Nov. 22, C. D.—Nov. 28. E. N.-R.

Tex., **Anton**—City, c/o H. G. Richards, mayor, waterworks, incl. well, pump house, pump, elevated tank and tower, meters, c.i. distribution system, fire hydrants, 10,850 ft. 2- to 8-in. c.i. pipe, 100 g.p.m. at 250 head turbine well pump, to Panhandle Constr. Co., Lubbock, $23,793. Est. $21,500. **P.W.A.** Bids Nov. 27, awarded Dec. 31. Noted Dec. 10, C. D.—Nov. 21, E. N.-R.

Tex., **Boyd**—City, c/o J. D. Walton, mayor, constructing deep well, turbine pump, elevated tank and distribution system, to Texas Automatic Sprinkler Co., 2330 Summers St., Dallas, $16,809. Est. about $16,000. Noted Dec. 23, C. D.—Dec. 26, E. N.-R.

Tex., **Center**—City Council, c/o O. J. Rushing, secy., c.i. pipe lines, filter house, pumping station, pump and motors, filter plant, to Ben Sira & Co., 3101 Elm St., Dallas, $73,462. Est. $75,000. **P.W.A.** Noted Dec. 23, C. D.

Tex., **Denison**—City, c/o C. Scott, mayor, constructing waterworks improvements and sanitary sewerage system, incl. feeder mains, filter plant, sanitary sewerage system and lift pumping station, etc., to W. G. Cullum & Co., Great Natl. Life Bldg., Dallas, $44,622. Est. $50,000. **P.W.A.** Bids Dec. 19. Noted Dec. 12, C. D.

Tex., **Griffing Park**—City, c/o E. O. Smith, mayor, waterworks improvements, incl. 10,400 ft. 6 in. c.i. pipe, hydrants, valves, to H. and R. Constr. Co., Houston, $17,428. Est. $18,000. **P.W.A.** Bids Nov. 29, awarded Jan. 4. Noted Dec. 16, C. D.—Nov. 21, E. N.-R.

Tex., **Savoy**—City, c/o W. H. Harper, mayor, waterworks, incl. deep well, distribution mains, pumping plant and pump house, to W. H. Cramer, 3710 Oak Grove St., Dallas, $14,404; elevated tank, to Viking Supply Co., 2330 Summers St., Dallas, $4,242. Est. about $21,000. P.W.A. Bids Oct. 18, awarded Jan. 2. Noted Oct. 7, C. D.—Oct. 10, E. N.-R.

Wash., **Shelton**—City, installing pump and electrical equipment at new city well, to Worthington Co., Inc., 922 First Ave. S., Seattle, $1,118. Bids Dec. 5, 50,000 gal. wooden aerating tank, day labor. Noted Dec. 30, C. D.—Jan. 2, E. N.-R.

Wash., Wenatchee—City, removing mains and replacing with c.i. or wood pipe, to Washington Corrugated Culvert Co., 4327 Roosevelt Way, Seattle, $1.13 per ft. Est. $23,408. Federal fund $8,820. Sponsor's contribution $14,588. **P.W.A.** Noted Sept. 3, C. D.—Sept. 5, E. N.-R.

B. C., Vancouver—E. A. Cleveland, engr., Greater Vancouver Water Dist., Bekins Bldg., supplying 14,400 ft. 63 in. steel cylinder rein.-con. pipe, to Pressure Pipe Co. of Canada Ltd., 510 West Hastings St., $251,842***laying pipe, to Harrison & Lamond, 615 West Hastings St., $133,095***valves, to Bayfield & Archibald, 448 Seymour St., $8,420***flanges and couplings, to Reliance Fdry. Co. Ltd., 149 West 4th Ave., $1,523. Grand total $394,880. Noted Dec. 19, C. D.—Dec. 26, E. N.-R.

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Calif., Maxwell—Maxwell Utility Dist., election Feb. 27, to vote bonds for sewerage and waterworks improvements. $45,000. Former bond election cancelled. Noted Oct. 14, C. D.—Oct. 17, E. N.-R.

Calif., San Gabriel—City plans sewage disposal plant and sanitary sewer collection system. $490,000. Plans special election to vote on bond issue of $250,000 to assist in financing. P.W.A. project. Koebig & Koebig, Rowan Bldg., Los Angeles, engrs. Noted Nov. 27, C. D. —Dec. 5, E. N.-R.

Calif., Stockton—City Council commissioned C. C. Kennedy, engr., Call Bldg., San Francisco, to make plans for enlargement of sewage disposal plants, work to be contingent upon approval of $110,000 bond issue at special election, Feb. 18. P.W.A. has allotted grant of $90,000. Noted Sept. 11, C. D.—Sept. 19, E. N.-R.

Conn., New Britain—Bd. P. Wks. bids late in February, superstructure of sewage disposal chemical treatment plant at Berlin. Total est. $380,875. P.W.A. project. Fuller & McClintock, 11 Park Pl., New York, engrs. Excavation for same, to F. H. McGraw & Co., 51 East 42nd St., New York, $8,910. Bids Dec. 10. Noted Dec. 18, C. D.

Conn., Wethersfield — Metropolitan District, Bureau P. Wks., soon takes bids Folly Brook Sewer Project, incl. 1,000 ft. 21 in. and 2,200 ft. 30 in. sewer main in Victoria Rd.; 1,600 ft. 27 in. and 3,200 ft. 30 in. sanitary sewer in North Folly Brook Blvd.; 1,080 ft. 20 in., 1,560 ft. 18 in., 2,040 ft. 12 in., 2,110 ft. 15 in. and 1,000 ft. 10 in. sewers in Folly Brook Blvd. South; 7,101 ft. 20 in., 1,410 ft. 18 in., 1,907 ft. 15 in. and 937 ft. 12 in. sewer main in Nott St. South. Est. $147,000. R. N. Clark, 550 Main St., Hartford, engr. P.W.A. project. $66,000 grant.

Ind., Muncie—Bd. P. Wks., L. Bracken, chn., City Hall, soon takes bids constructing sewage disposal plant, incl. concrete, brick pump house, 6- to 15-in. vitr. clay pipe, salt glazed interior face brick, waterproofing, creosoted treated wood, structural steel, composition roofing, tubular steel doors, one 10 ton, 38 ft. span and one 5 ton 17 ft. span electric traveling cranes, 7 electric sump pumps, 2 steel heating boilers, 11 centrifugal pumps, 17,160 ft. gas storage pump, ventilating fans electrically driven, wire fencing, deep well turbine type pumping unit, air compressor and tank, etc. P.W.A. project. A. K. Meeker, Muncie, city engr. G. B. Gascoigne, Leader Bldg., Cleveland, O., consult. engr. Noted May 3, 1934, C. D.—May 19, 1934, E. N.-R.

Ind., New Albany—Bd. Pub. Wks., J. Hauswald, mayor, soon takes bids constructing 2 mi. 10- to 18-in. exposed c.i. pipe sewers on rein.-con. piers for West Union Sewer Dist. $225,000. Applied for W.P.A. funds. M. M. Boland, city engr.

Mo., McKnight Village—Village soon takes bids constructing 1,500 ft. sanitary sewers in district north of LaDue Rd. on north Gay Ave. east and line 500 ft. west of Price Rd. north in McKnight Village Sanitary Dist. of St. Louis Co. $87,500 bonds voted. $64,125 P.W.A. funds applied for. W. W. Horner, 1325 International Office Bldg., St. Louis, engr. Noted Jan. 3, C. D.

N. Y., Yonkers—City bids early in spring, interceptor sewer from Main St. along Hudson River front to South Yonkers Sewage Disposal Plant. P.W.A. project. $250,000. $122,500 funds allotted. C. Sheridan, city engr.

O., Greenville—City, slightly revising plans and takes bids early in February, sewage treatment works. Former contract abandoned. $130,000. P.W.A. project. Noted Dec. 27, C. D.—Jan. 2, E. N.-R.

Tex., Quanah—City voted $12,000 and federal government will provide $80,000 funds for sanitary sewer extensions, municipal park with playground equipment, etc. Total $92,000.

★ **Wash., Tacoma**—City plans new sewerage system. $3,000,000. C. Forsbeck, City Hall, engr.

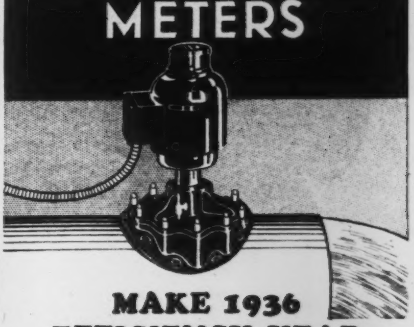
Wis., Oconomowoc—City soon takes new bids constructing sewage treatment plant. $109,000. Bids Dec. 30 rejected. P.W.A. project. J. Donohue Eng. Co., Sheboygan, engrs. Noted Jan. 7, C. D.

Constr. News page 49

---

†*Federal Government.*

SPARLING
MAIN-LINE
METERS



MAKE 1936
EFFICIENCY YEAR

Production and handling of water or other liquids is a definite expense. If you know exactly your costs and production you can more readily check those hidden wastes and losses which so easily creep in.

Sparling Meters and Recorders give basic information on daily, monthly and yearly water production, providing a continuous ink record of flow to check with like periods of operation.

Their use by the Federal Government, many states and thousands of cities and large corporations is your best recommendation.

Sparling equipment is easily installed without disturbing operations and sold on a "prove-it" basis. New Bulletin 303E will be off the press shortly. On request from nearest office.

R. W. SPARLING

NEW YORK 101 Park Ave.
CHICAGO 3104 S. Michigan
LOS ANGELES 945 N. Main St.

PITTSBURGH TANKS DES MOINES

WATER
TREATING
TANKS

Investigation will reveal to you that a filter or water treating plant can be best and most economically built by using steel in the construction of mixing chamber, sedimentation basin, filter, clear well and wash water tank. Note the uniform flow obtained in a spiral baffle sedimentation tank. Write for estimates and information.

PITTSBURGH · DES MOINES
STEEL COMPANY

High Quality Castings
PLUS PRECISION MACHINE WORK AND PROMPT SERVICE

Bell & Spigot Pipe and Fittings. From 4" to 54".

Cast Iron Flanged Pipe. From 3" to 84".

Cast Iron Flanged Fittings and Flanges. From 1" to 84".

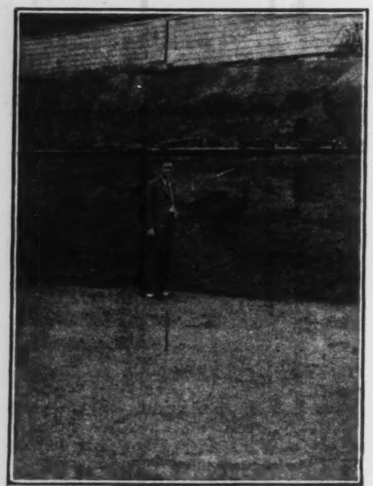
Super-de Lavaud Centrifugal Cast Iron Pipe.

Special Iron Castings for the Chemical Industry.

Lynchburg Foundry Company
General Office - Lynchburg, Virginia

Peoples Gas Building
Chicago, Ill.

50 Broad St.
New York, N. Y.



A ONE HUNDRED PER CENT MORETRENCH WELLPOINT SYSTEM makes wet jobs dry—and PROFITABLE. Cheaper—less units, operation costs—half of other methods. "Your system continues to function perfectly and never clogs up," says a MORETRENCH user.

We've been at it ten years and can dry up any job.

MORETRENCH CORPORATION
Works: Rockaway, N. J.
Sales Office: 90 West St., New York City

Sewerage, etc. (Continued)

BIDS ASKED

Conn., Bridgeport—See "Contracts Awarded."

Conn., Niantic — Jan. 27, by Quartermaster General, State Armory, sanitary sewerage system State Military Reservation, incl. sewage disposal field, mains, septic tank, leaching chambers, etc. $25,000. Blair & Marchant, 100 Crown St., New Haven, engrs. Noted June 13. C. D.—June 20, E. N.-R.

Conn., Windsor — Jan. 29, by Metropolitan Dist., Bureau P. Wks., constructing sewers in Plymouth St., Wilton, Park and Laurel Aves., Harvey, Hillcrest, Ludlow Rds., also connecting trunk line. $30,000. C. Saville, 1026 Main St., Hartford, engr.

Idaho, Rigby—See "Contracts Awarded."

N. J., Essex Falls—Feb. 10, by City, sewage disposal plant. $60,000. F. McClintock, 11 Park Pl., New York, engr. Noted May 23, C. D.—May 30, E. N.-R.

★ **N. Y., Niagara Falls** — Jan. 31, by W. Clarke, city engr., constructing sewage treatment plant, Contr. 3, for City. $1,300,000. G. L. Watson, 11 West 42nd St., New York, consult. engr. P.W.A. project. Noted Dec. 10, C. D.—Dec. 12, E. N.-R., under "Contracts Awarded."

N. Y., St. George—Jan. 29, by J. A. Palma, pres. Richmond Boro, sanitary sewer in Cayuga Ave. from Oswego St. to point about 340 ft. southerly with all work incidental thereto.

CONTRACTS AWARDED

Ariz., Phoenix—Tovrea Packing Plant, constructing private sewage disposal plant, day labor. Est. $45,000. Work started.

Calif., Laguna Beach — E. H. Beaver, city clk., constructing vitr. clay sewers in Coast Blvd. and other streets, Sewer Dist. 3, and constructing vitr. clay sanitary sewers in Park Ave. and other streets, alleys and right-of-way, Dist. 2, to O. U. Miracle Co., 4751 Monroe St., San Diego, $75,440 and $32,037 respectively, est. $99,500 and $45,500 respectively. Bids Jan. 8. Noted Jan. 6, C. D.

Colo., Greeley — City Council, dry chemical feeders for sewage disposal plant, to Dana & Kepner, 1921 Blake St., Denver, $580***mechanical shredder, to Lakeside Eng. Corp., 928 South Williams St., Denver, $2,575***gas boiler, to Wm. A. Lott Co., Greeley, $517***sludge pump, radiators, hot water meter, to Hendrie & Bolthoff Mfg. Co., Denver, $246***clarifier, flush mixer and reaction mixer, to Dorr Co., Inc., Denver, $102***sludge pump, sludge digester, to Pacific Flush Tank Co., 1921 Blake St., Denver, $5,439***gas meters, flame trap, waste gas burner, hot water pump, thermometers, expansion tank, to Crane Fallon Co., Denver, $535. Grand total $9,994. **P.W.A.** Noted Oct. 18, C. D.

Conn., Bridgeport — City, constructing storm and sanitary sewers, as follows, bar screen, Ashlet St. outlet, $947***storm sewer, Hillside Ave., $711***storm and sanitary sewers, Seaside Ave., $10,323; Texas Ave., $7,464; sanitary sewer, Ohio Ave., $10,106, W.P.A. labor. Total $29,551. P. Brewster, P. Wks. Dir.

Conn., Danbury—L. F. Sweeney, general contractor, 15 Bates Pl., rotary distributors for sewage disposal plant, to American Wells Co., Aurora, Ill., for City***sludge collector system, to Link Belt Co., Hunting Park Ave. and Nicetown St., Phila., Pa.***chemical feeds, to Wallace & Tiernan Co., 11 Mill St., Belleville, Newark, N. J. **P.W.A.** Noted Dec. 11, C. D. —Dec. 19, E. N.-R., under "Contracts Awarded."

Idaho, Rigby—Town, constructing sewerage system by relief labor. $25,000. **W.P.A.** R. Rehberg, town engr.

Ia., Osceola—Town Council, storm sewers, to Amodeo Paving Co., Des Moines, $16,780; sanitary sewers, to Dobbs & Humphreys, Lincoln, Neb., $35,780. **P.W.A.** Bids Jan. 6.

Md., Baltimore—Bd. Awards, building Settling Tanks 3 and 4, at Back River Sewage Treatment Works, to V. Schiavi, Wilmington, Del., $226,687. Bids Jan. 8. Noted Jan. 14, C. D.

N. J., Elizabeth—J. L. Boyle Eng. & Constr. Co., general contractors, 437 Riverside Ave., Newark, 136 tons reinforcing steel for joint trunk sewer for disposal plant, for City, to Truscon Steel Co., Youngstown, O. Noted Oct. 29, C. D.—Oct. 31, E. N.-R., under "Contracts Awarded."

N. J., Metuchen—Boro, general contract sewage treatment plant, to Midland Constr. & Contg. Co., 270 Main St., Hackensack, $95,337. **P.W.A.** Noted Dec. 3, C. D.—Dec. 5, E. N.-R.

N. Y., Buffalo—City, borings for sewers, to Riley Eng. & Drilling Co., 1733 East 31st St., Brooklyn, $52,332. Est. $60,000. **P.W.A.** Bids Jan. 14. Noted Jan. 2, C. D.—Jan. 9, E. N.-R.

N. Y., Herkimer—Bd. Village Trustees, sewage disposal plant, to H. R. Beebe, Inc., 404 Court St., Utica. Est. $60,000. **P.W.A.** Bids Dec. 10. Noted Dec. 19, C. D.—Nov. 28, E. N.-R.

N. Y., New York—T. W. Hammond, comr. Dpt. Sanitation, 125 Worth St., plumbing for 750 ton destructor plant, 56th St. and 12th Ave., to Endres Plumbing Corp., 1365 29th St., Long Island City, $33,700***chimney, to M. W. Kellogg Co., 225 Bway., $59,450***heating, to Dierks Heating Co., 210 East 31st St., $151,793***electrical work, to Consolidated Electric Co., 205 West 42nd St., $44,275. Grand total $289,218. **P.W.A.** Bids Dec. 2. Noted Dec. 3, C. D.—Nov. 28, E. N.-R.

N. Y., St. George—J. A. Palma, pres. Richmond Boro, Boro Hall, constructing sanitary sewers in Wiman Ave., to DeMicco Contg. Co., 1567 Yates Ave., $31,341; relaying sewage pumping station, to Auserahl & Sons, 139-11 Queens Blvd., Jamaica, $33,169. Bids Jan. 8. Noted Jan. 9, C. D.—Jan. 2, E. N.-R.

N. Y., Yonkers—City, City Hall, garbage incinerator, two 75 ton refuse furnaces, 100 ton storage bin, electric crane to carry garbage from bin to furnaces, to Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa., $130,000. Awarded Dec. 26.

O., Columbus—City, Columbus Sewage Treatment Works, installing air main and main drain, Contr. 21, to Boyd & Cooke Co., 830 Union Trust Bldg., Dayton, $60,699 est. $64,000***furnishing, installing 2 mechanically cleaned screens, 2 grinders with appurtenances, Contr. 12, to Jeffrey Mfg. Co., 2 1st Ave., $9,385 est. $15,000***installing storm drains, Part 4, Contr. 64, Hudson St. Dist., to Thompson Conie Co., 795 Casingham Rd., $39,483 est. $50,000. Grand total $109,567. **P.W.A.** Noted Jan. 17, C. D.—Jan. 23, E. N.-R.

O., Springfield—City, constructing 2,000 ft. rein.-con. sewer and appurtenances, Sect. H. Contr. 11, Mill Run Intercepting Sewer, to Connelly Bros., 2nd Nalt. Bank Bldg., Cincinnati, $23,817. Est. $36,804. **P.W.A.** Bids Nov. 29. Noted Dec. 10, C. D.—Dec. 12, E. N.-R.

Pa., Wilkes Barre—City, constructing two 75 ton incinerator units, single preheater, 200 ton chimney capacity, P.W.A. 1180, to Hiler Eng. & Constr. Co., 122 Livingston St., Brooklyn, N. Y., $129,000.

Tex., Dallas—City, c/o A. P. Rollins, dir. P. Wks., additional pumping equipment and c.i. force main at Cadiz Pumping Station, to Cooper-Bessemer Corp., 1814 Magnolia Bldg., $37,999. Est. about $40,000. **P.W.A.** G. Franklin, city engr.

Tex., Denison—See "Waterworks."

Wis., LaCrosse—City, constructing sewers, to T. J. Molzahn & Son, LaCrosse, $59,429. Bids Jan. 7. Noted Jan. 15, C. D.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

Fla., Port Orange—Port Orange Bridge Corp. making plans and soon takes bids constructing steel drawbridge across Halifax River and East Coast Canal. $100,000. R. L. Riggs, Ocala, engr. and archt.

Mass., Pittsfield—City, P. Wks. Dpt., preliminary plans 3 rein.-con. bridges, Charles Ave., Pomeroy Ave. and Lakewood Drive. $100,000. P.W.A. project. Federal aid of $35,000. A. B. Farnham, P. Wks. Comr.

New York—Dpt. P. Wks., Albany, bids in spring 1936, constructing steel bridge with concrete abutments, on Hy. 5575, between Perry City and Trumansburg.

N. Y., Buffalo—Lehigh Valley R.R. Co., G. T. Hand, ch. engr., Bethlehem, Pa., plans nearing completion and takes bids early in 1936, eliminating grade crossing by raising tracks and constructing 30 ft. vehicular tunnel, incl. pedestrian tunnel. $220,000. Noted May 16, C. D.—May 23, E.N.-R.

N. Y., Chili—Dpt. P. Wks., State Office Bldg., Albany, plans replacing old bridge with rein.-con. bridge for 4 lanes of traffic over Black Creek, Atridge Rd., southwest of Chili Station, Monroe Co. T. F. Farrell, Albany, engr.

N. Y., Cortlandt—Bd. Supervs. Westchester Co., plans constructing 2 steel, concrete bridges to replace Gallows Hill and Crugers Station bridges. To exceed $23,000. C. H. Sells, co. engr.

★ **N. Y., Herkimer**—New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York and State, Albany, plan grade crossing elimination project in southern part of village, incl. underpasses at South Washington and Mohawk Sts. near Carroll Park; and new passenger station at Mohawk St. $1,500,000.

N. Y., New York—Transit Comn., 270 Madison Ave., received no bids Jan. 17, reconstructing bridge carrying West 184th St., (West Fordham Rd.) over main line and Putnam Division of New York Central R.R., University Heights Station, Bronx Boro. Noted Dec. 30, C. D.—Jan. 2, E. N.-R.

Texas—State Hy. Comr., H. Hines, chn., Austin, plans constructing P. and S. F. R. R. underpass and approaches with concrete pavement in Follet Hy. 117, W.P.G.M. 662-D, Lipscomb Co., $22,552; T. and N. O. R. R. underpass and approaches, hot mix asphaltic concrete paving on Hy. 15, Dallas Co.; G. C. and S. F. R. R. underpass and approaches, and concrete pavement Hy. 7, W.P.G.M. 224-C, and W.P.G.S. 224-C, Shelby Co., $62,000; F. W. and R. G. R. R. overpass and approaches, 1.5 mi. south of Brown County line on Hy. 23, W.P.G.M. 584-E, McCulloch Co., $47,500; Texas Mex. R. R. overpass and approaches, asphalt on limestone surface treating on Hys. 66 and 12, W.P.G.S. and M. 834, Jim Wells Co.; G. H. and S. A. R. R. overpass and approaches, Hy. 4, W.P.G.M. 838-A, Uvalde Co., all foregoing new P.W.A. project.

†Federal Government.

Bridges, etc. (Continued)

Texas — State Hy. Comn., H. Hines, chn., Austin, preparing plans and soon takes bids B. S. and L. and N. R.R. overpass and approaches, Hy. "F" WPGS 861-A, Liberty Co.; K. C. S. R.R. underpass and approaches, Hy. 8, WPGM 53-B, Jefferson Co.; I. G. and N. R.R. overpass and approaches, Hy. 64, WPGH 423 D, Smith Co.; T. and N. O. R.R. underpass and approaches, and concrete pavement on Hy. "F", WPGM 994-A, Brazos Co.; T. and P. R.R. underpass and approaches, Hy. 1, WPGH 132-B, Part 3, Parker Co.; M. K. and T. R.R. overpass and approaches, Hy. 595-G, Cooke Co. New P.W.A. project.

Tex., San Antonio—City, C. K. Quin, soon takes bids underpass on West Commerce St. at Missouri Pacific R. R. crossing, rein.-con. retaining walls and supports, $250,000; 190 ft. rein.-con. undercrossing, rein.-con. walls, rein.-con. pier supports, north side at Missouri Pacific crossing, $200,000; 170 ft. underpass, St. Marys St., Missouri, Kansas and Texas R. R. crossing, $250,000. W.P.A. project. I. Ewig, city engr. Noted Nov. 12, C. D.—Nov. 14, E. N.-R.

BIDS ASKED

Delaware—See "Streets and Roads."

Delaware—Feb. 5, by State Hy. Dpt., Dover, constructing Bridges 707-708, Rd. 174, Bridge 589 Rd. 148, Contr. 469; repairing old bridge Lebanon Rd., Contr. 438; removing old Bridge 553, Rd. DK8, Contr. 468, all foregoing in Kent Co.; repairing old Bridge 606, Bridges 18-19, Contr. 466; repairing old Bridge 90 on Rd. 417, Bridge 90, Rd. 403, Contr. 467; repairing old Bridge 222, Rd. 565, Contr. 465; repairing 3 bridges Millsboro-Centenary School Rd., Contr. 398, all foregoing in Sussex Co. W. W. Mack, Dover, engr.

Idaho—Jan. 31, by G. E. McKelvey, comr. P. Wks., Boise, constructing 295 ft. concrete overhead structure over Oregon Short Line R.R. and grading, surfacing approaches 0.488 mi. Idaho-Montana Hy., Monida, Clarke Co., incl. 4,000 cu.yd. solid rock and 58,000 cu.yd. common excav.

Idaho—Jan. 31, by G. E. McKelvey, comr. P. Wks., Boise, constructing 483 ft. steel, concrete bridge and grading and surfacing 0.467 mi. Lost River Hy., at Blackfoot, Bingham Co., incl. 14,500 cu.yd. unclassified excav., 80 cu.yd. structural excav. for culverts and 1,040 cu.yd. structural excav. for bridges.

Indiana—Feb. 4, by State Hy. Comn., Indianapolis, constructing 40 ft. steel beam, rein.-con. bridge over Morton Hall Ditch, and 120 ft. bridge over Rock Creek, near Reddington, Bartholomew Co.; 110 ft. rein.-con. bridge over Brush Creek, near Reddington, 30 ft. rein.-con. arch and 16 ft. rein.-con. slab bridge over Falling Run Creek and drainage ditch, in and near New Albany, Floyd Co.; 60 ft. rein.-con. girder bridge over Little Bridge Creek, and 36 ft. rein.-con. arch bridge over Prairie Creek, south of Brazil, Clay Co.; 54 ft. steel on creosoted piling bridge over Scofield Ditch and 125 ft. bridge over Mootser Ditch, west of Brookston, White Co.; 202 ft. steel beam bridge, grading, paving approaches over B. & O. Ry., Kimmel, Noble Co.; 38 ft. rein.-con. girder bridge extension over C. & R. I. Ry., near Oaktown, Knox Co.; 46 ft. rein.-con. girder bridge over B. & O. Ry., Lapaz, Marshall Co.; 36 ft. rein.-con. bridge over Sandy Branch, Rural District, Jackson Co.; 31 ft. steel beam bridge and grading, paving 0.38 mi. over B. & O. Ry., Rural District, Jackson Co.; 432 ft. rein.-con. bridge and grading, paving 0.49 mi. approaches over Penn and Wabash Rys., Gary, Lake Co.; 120 ft. creosoted timber bridge over B. & O. Ry., North Salem, Hendricks Co.; 920 ft. rein.-con. substructure for bridge over Wabash River and State Rd. 43, Lafayette, Tippecanoe Co.; 41 ft. rein.-con. girder bridge over Dredge Ditch, south of Vincennes, Knox Co. M. R. Keefe, state hy. engr.

Kan., Topeka—Jan. 30, by State Hy. Comn., at office of Commission, Topeka, south approach to river spans on Topeka Ave. and north approach to river spans on Topeka Ave., Project 75-25A-WPGM 46-C, Parts 1 and 2, Shawnee Co.

Mass., Springfield—Jan. 31, by City, C. W. Phillips, supt. Streets, reconstructing superstructure, wing wall, bridge seats, sidewalks, rail piping and approach fences, also retaining walls, rein.-con. and steel construction, Armory St. $30,000. S. N. King, 646 Summer Ave., engr.

New York — Feb. 6, by Triborough Bridge Authority, 111 8th Ave., New York, buildings and tool plazas of Triborough Bridge connecting Manhattan, Bronx and Queens Boros, Contr. 59.

N. Y., Fort Wadsworth—Jan. 31, by Transit Comn., 270 Madison Ave., New York, reconstructing bridge carrying tracks of Staten Island Rapid Transit Ry. Co. across St. Johns Ave. and related structures, here. Bids Jan. 10, rejected. Noted Jan. 13, C. D.—Dec. 26, E. N.-R.

N. Y., Staten Island — Feb. 7, by Transit Comn., 270 Madison Ave., New York, reconstructing bridges carrying Major and McLean Aves. over tracks of Staten Island Rapid Transit Ry. Co., at Arrochar; and bridge carrying tracks of Staten Island Rapid Transit Ry. Co. over Robin Rd. South Beach.

North Carolina—See "Streets and Roads."

North Dakota—See "Streets and Roads."

Ohio—See "Streets and Roads."

O., Hamilton—Feb. 11, by Comrs. Butter Co., Court House, 2 steel truss hy. bridges, 1 of two 105 ft. spans over Fourmile Creek at New Miami, $49,091 and other of two 100 ft. spans at Collingsville, concrete piers and abutments, $41,818. P.W.A. project. Noted Sept. 12, C. D.—Sept. 19, E. N.-R.

Pennsylvania—See "Streets and Roads."

Texas—State Hy., Austin, bids about Mar. 1, rein.-con., steel bridge over Guadalupe River on Seguin-Stockdale Hy., Guadalupe Co. $100,000.

†Washington—Pub. Rds., 316 New Post Office Bldg., Portland, Ore., preliminary bid notice constructing bridge and approaches on Randle-Yakima East Side Hy. 13-Q.I.S., Lewis Co. $50,000. Will not advertise for bids until after this winter. W. H. Lynch, dist. engr.

Wisconsin—Feb. 4, by State Hy. Comn., Milwaukee, constructing bridges, culverts and structures on Beloit-Janesville Rd., Hy. 51, W.P.M.H. 42 and 96-D, Rock Co., incl. 1,225 cu.yd. structural excav.; bridges, structures on Milwaukee Racine Rd., Rawson-Howell Overhead Structure, Milwaukee Co., 3,955 cu.yd. excav.; constructing bridge and overhead on Sparta-LaCrosse Rd., Medary Overhead, LaCrosse Co., 2,980 cu.yd. excav.; structures on Strum-Brackett Rd., County Trunk Hy. D, Eau Claire Co.

LOW BIDDERS

★ **N. Y., Binghamton** — Dpt. P. Wks., State Bldg., Albany, and Erie R.R. Co., Cleveland, Dec. 31, constructing grade crossing elimination, from Walsh Constr. Co., Herald Bldg., Syracuse, Est. $1,500,000. Noted Dec. 23, C. D.—Dec. 26, E. N.-R.

CONTRACTS AWARDED

Alabama—See "Streets and Roads."

California—See "Streets and Roads."

California—State Hy. Comn., Sacramento, constructing undergrade crossing under tracks of Southern Pacific R.R., ½ mi. south of Red Bluff, Tehama Co., to N. M. Ball Sons Co., P. O. Box 404, Berkeley, $91,790; undergrade crossing under tracks of Southern Pacific Co. at Lafayette St., in city Santa Clara, Santa Clara Co., to Barrett & Hilp, 918 Harrison St., San Francisco, $152,897. Bids Dec. 11, awarded Jan. 7. Noted Dec. 30, C. D.

Ill., Pittsfield—Dpt. P. Wks. & Buildings, Div. Hys., substructure for viaduct over Wabash R. R., Pike Co., to Christy Birt Co., Decatur, $38,521***structural steel for same project, to Midland Structural Steel Co., Cicero, $48,648 ***floor and rail for same bridge, to Ben Harrison Constr. Co., Jacksonville, $32,218*** grading 1.3 mi. approaches same project, to McCarthy Impvt. Co., Davenport, Ia., $59,294. Grand total $178,681.

Kansas—State Hy. Comn., at office of County Clerk, Cottonwood Falls, to M. E. Gillioz, Monett, Mo., bridges on hy. Project 50 S-28-FA 357-B, Parts 1 and 2, Chase Co., as follows: Bridge 0.4, two 35 ft. and one 70 ft., raising and extending, $7,266; Bridge 1.7, three 8x8 ft., skew, rein.-con. beam spans, $4,174; Bridge 1.8, two 20 ft., raise and re-seat, $1,984; Bridge 4.6, three 20 ft., raise and re-seat, $8,176; Bridge 6.3, three 10 ft. x 4 ft. x 24 ft., rein.-con. beam spans, $995; Bridge 7.8, two 35 ft. and one 70 ft. spans, $19,009. Grand total $41,604. Bids Jan. 3.

Kansas—State Hy. Comn. at office of County Clerk, Marysville, (**P. means Project**), Bridge 0.3, 24 ft., -35 ft., -24 ft., P. 75-22-WPGH 264-F, Osage Co., to O. O. Fuller Constr. Co., Nevada, $11,316***Bridge 1, 50 ft.-60 ft.-60 ft.-75 ft.-60 ft. continuous I-beam span, P. 50-46-WPGH 315-I, Johnson Co., to List Constr. Co., Railway Exchange Bldg., Kansas City, Mo., $51,790*** Bridge 1.6, 28 ft.-35-35 ft.-35 ft.-28 ft., continuous slab span, P. 10-10A-WPGH 58-C, Shawnee Co., to Maxwell Constr. Co., Columbus, $32,034. Grand total $95,140. Bids Dec. 31. Noted Dec. 17, C. D.—Dec. 19, E. N.R., under "Streets and Roads."

Kansas—State Hy. Comn., at office of County Clerk, St. Francis (**P. means Project**), Bridge 12.9, fifteen 70 ft. continuous I-beam spans, P. 36-1-ERP 1, Cheyenne Co., to Omaha Steel Wks., 609 South 48th St., Omaha, Neb., $100,556***Bridge 13.3, three 35 ft., rein.-con. deck girder spans, P. 36-1-ERP 1, Cheyenne Co., to A. L. Cook, Ottawa, $10,700***Bridge 5.1, five 30 ft., rein.-con. deck girder spans, P. 183-1B-FA 462-A, to D. L. Wheelock, Clay Center, $14,543***Bridge 5.4, three 10x9x32 ft., rein.-con. beam spans, P. 183-1B-FA 462-A, and Bridge 7.4, three 10x10x32 ft., rein.-con. beam spans, P. 183-1B-FA 462-A, to B. Anderson, $4,344 and $3,287 respectively, all foregoing in Decatur Co.***Bridge 5.9, six 40 ft., rein.-con. deck girder spans, P. 83-2-WPGM 343-F, Norton Co., to G. Knutson, Kansas City, Mo., $28,084***Bridge 6.85, two 12x12 ft., rein.-con. beam spans, P. 23-15-FA 494-D, Sheridan Co., to H. J. Hall Constr. Co., Manhattan, $5,381***Bridge 12, D.P.G. 1-14-PWS 80, Ellis Co., to D. G. Hansen, Logan, $48,316. Grand total $215,211. Bids Jan. 7. Noted Dec. 27, C. D.—Jan. 2, E. N.-R., under "Streets and Roads."

Kansas—State Hy. Comn., at office of Co. Clk., St. Johns, (**P. means Project**), Bridge 12.4, fifteen 30 ft. rein.-con. deck girder spans, P.

Constr. News page 51

---

†Federal Government.

"CASTELL"
DRAWING PENCILS

18 positively accurate gradings, 7B to 9H. The overwhelming choice of pencil craftsmen the world over . . . because the graphite is specially milled and refined by many exclusive processes to remove all grit and impurities. Meets the most exacting needs.

The Standard of the World
CASTELL DRAWING PENCILS
CASTELL DRAWING MATERIALS

"CASTELL" POLYCHROMOS
COLORED PENCILS

A new, simple method that gives the closest effect to actual oil painting. Can be used on any drawing, tracing or sketching paper or tracing cloth. Available in 65 colors. Made in Bavaria.

A.W.
FABER
INC. NEWARK, N.J.

Ransome

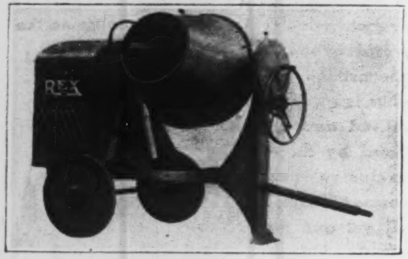
PNEUMATIC
PLACERS

RANSOME
PNEUMATIC
GROUTERS

Building Mixers
Paving Mixers
Tower & Chuting
Plants

Ransome Concrete
Machinery Company
Dunellen, New Jersey
Cable Address "Racomaco-Dunellen"

THE BEST ½-BAG MIXER BUY—ON THE MARKET



GET FACTS AND PRICES ON THIS NEW 1936 MODEL

STREAMLINED AND ROLLER BEARING EQUIPPED . . .

CHAIN BELT COMPANY

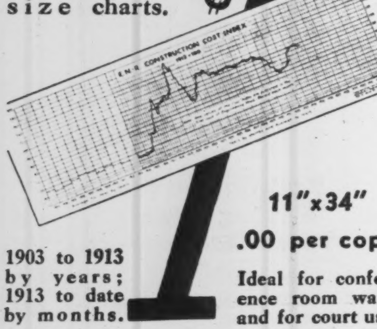
1633 W. Bruce Street, Milwaukee, Wisc.

REX *Construction Equipment*

Enlarged by Request!

ENGINEERING NEWS - RECORD Construction Cost Index

. . . perhaps you, too, could use one of these wall-size charts.


E N R CONSTRUCTION COST INDEX

$1

11"x34"

.00 per copy

1903 to 1913 by years; 1913 to date by months.

Ideal for conference room walls and for court use.

Send orders to Const. News Dept.
Engineering News-Record, 330 W. 42d St., N. Y.

Bridges, etc. (Continued)

17-2-FA 395-C, Reno Co., to Geiger & Rutherford, Leavenworth, $38,925***Bridge 13.5, 77 ft. 6 in. through plate girder span, P. 96-25-WPGH 396-B, Butler Co., to List & Weatherly Constr. Co., Railway Exchange Bldg., Kansas City, Mo., $30,935***Bridge 5.1, four 30 ft. rein.-con. deck girder spans, P. 8-9-FA 452 F, and Bridge 4.7, thirteen 30 ft., rein.-con. deck girder spans, P. 8-9-ERP 12, both Stafford Co., to D. H. Hardman, Alton, $11,683 and $35,020 respectively***Bridge 6.5, 55 ft.-65 ft.-55 ft., continuous steel beam spans, P. 77-2-WPGH 231 G, Cowley Co., to List & Clark Constr. Co., Railway Exchange Bldg., Kansas City, Mo., $21,398***Bridge 4.2, four 30 ft. rein.-con. deck girder spans, P. 8-6-FA 508 C, Pratt Co., to **C. L. Ring, McPherson, $14,316.** Grand total $157,277. Bids **Jan. 4.**

Mass., Quincy—Commonwealth of Massachuseets, Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston, Project 260, abolition of grade crossing consisting of steel bridge over New York, New Haven & Hartford R.R. drainage system and bituminous macadam approaches with bituminous concrete surface on bridge, Water St., tc Coleman Bros. Corp., 245 State St., Boston, Design 1, bituminous macadam approaches, $238,821. Bids Jan. 7, awarded Jan. 10.

Neb., Big Springs—Deuel Co., constructing bridges to Inland Constr. Co., 3867 Leavenworth St., Omaha, $42,737; guard rails, to Third City Sand Co., Grand Island, $538. Est. $42,000. **P.W.A.** Noted Dec. 30, C. D.

N. J., Atlantic City — Freeholders Atlantic Co., plans constructing new rein.-con. overpass 90 ft. over Absecon Blvd. to Delilah Rd. north bound traffic. Federal as W.P.S.O. approved $125,000. A. H. Nelson, Atlantic City, engr.

New York—D. B. Riggs, general contractor, Troy, structural steel for bridge in Rensselaer Co., to McClintic Marshall Corp., Bethlehem, Pa.; W. J. Knauer & Co., general contractor, Attica. 210 tons structural steel for bridge in Cattaraugus Co., to McClintic Marshall Corp., Bethlehem, Pa., for Dpt. P. Wks., Albany. Noted Nov. 15, C. D.—Nov. 21, E. N.-R., under "Contracts Awarded."

New York—O'Grady & Quillinan, general contractors, Cohoes, 125 tons structural steel for bridge near Marathon, in Cortland Co. for Dpt. P. Wks., Albany, to American Bridge Co., Frick Bldg., Pittsburgh, Pa.; E. Cerullo, general contractor, Depew, 160 tons structural steel for bridge in Lancaster, Erie Co., to R. S. McManus Steel Co., Inc., 1254 East Ferry St., Buffalo. Noted Dec. 26, C. D.—Jan. 2, E. N.-R., under "Contracts Awarded."

New York—Palette & Santos, general contractors, Amsterdam, 280 tons structural steel for grade crossing elimination at Rip Van Winkle Bridge, Greene Co., to McClintic Marshall Corp., Bethlehem, Pa., for Dpt. P. Wks., Albany. Noted Dec. 3, C. D.—Dec. 5, E. N.-R., under "Contracts Awarded."

New York—Dpt. P. Wks. & Buildings, Div. Hys., Albany, reconstructing 10 bridges in Lodi, Ovid, Covert, to J. Bellardino, Seneca Falls, $63,206.

★ **New York**—Triborough Bridge Authority, 111 8th Ave., New York, paving East River Dr. from East 92nd St. to East 124th St., to J. Leopold & Co., 60 East 42nd St., New York, $579,196. **P.W.A.** Bids Dec. 19. Noted Dec. 19, C. D.—Dec. 5, E. N.-R.

N. Y., New York — Henry Hudson Parkway Authority, Arsenal Bldg., Central Park, constructing Riverside Drive Connection of Henry Hudson Parkway, to P. T. Cox Constr. Co., 154 Nassau St., $277,772. **P.W.A.** Bids Jan. 3. Noted Jan. 6, C. D.—Dec. 26, E. N.-R.

N. Y., New York—Henry Hudson Parkway Authority, Arsenal Bldg., Central Park, constructing 232nd Street Bridge over Henry Hudson Parkway, to Doyle & Doyle, Inc., 72 Carman Rd., Scarsdale, $91,690. **P.W.A.** Bids Dec. 27. Noted Dec. 17, C. D.—Dec. 26, E. N.-R.

N. Y., New York—Washburn Wire Co., 117th St. and Harlem River, 2 bridges at 118th and 118th Sts. and tunnel to East River Dr., to J. H. Deeves & Bro., 103 Park Ave. Est. $150,000.

Oregon—See "Streets and Roads."

Oregon—State Hy. Comn., Salem, constructing bridge over Monument Creek, to T. Lillebo, Reedsport, $62,818. R. H. Baldock, Salem, engr. Bids Nov. 31.

Texas—G. Gilchrist, state hy. engr., Austin, 1 deck plate girder span underpass, concrete abutments, etc., on Hy. 43, Milam Co., to Thomas & Ratliff, Rogers, $53,910. Bids Dec. 20. Noted Jan. 3, C. D.

Texas—G. Gilchrist, state hy. engr., Austin, steel, concrete bridge on Hy. 29, E.R.P. 1, Sect. 3HC, Llano Co., to Austin Bridge Co., 1813 Clarence St., Dallas, $155,724. Est. $160,000. Bids Dec. 20. Noted Jan. 3, C. D.

Utah—See "Streets and Roads."

Vermont—State Hy. Dpt., Montpelier, H. E. Sargent, ch. engr., 2 rein.-con. bridges with 0.3 mi. gravel approaches, Project WPSO 207-A, Pawlet, to M. J. Burrington, Jr., Bennington, $19,662***one 2 span I-beam bridge with 0.2 mi. gravel approaches, Project WPMS 208, Montpelier and Berlin, to E. G. Hayden, Barre, $17,390***gravel surface course paving 0.5 mi. Project WPSO 195-A, Newbury to Lockwood Young Co., Concord, N. H., $7,901, all foregoing bids Jan. 3, awarded Jan. 10; Hurd Bridge, P.W.A. 1020-A, Sandgate, to H. D. Moore, Williamstown, Mass., $7,808. Bids Dec. 20. Grand total $52,761. Noted Jan. 13, C. D.

B. C., New Westminster—Provincial Government, Victoria, approximately 100,000 bbl cement to be used for constructing Fraser River Bridge near here, to B. C. Cement Co., $2.10 per bbl., less 2% in 30 days, plus 25c. per bbl. delivered on job, total about $235,000. Noted June 28, C. D.—July 4, E. N.-R.

Ont., Carrying Place—Dpt. Hys., Parliament Bldgs., Toronto, steel for 160 ft. steel swing bridge with approach span over Murray Canal to Hill Steel Constr. Co., 6 James St. S., Hamilton. Noted Oct. 30, C. D.—Nov. 7, E. N.-R., under "Contracts Awarded."

STREETS AND ROADS

BIDS ASKED

Arizona — Jan. 30, by State Hy. Comn., Phoenix, grading, draining 0.8 mi. roadway and furnishing, placing road mix and seal coat both ends bridge at Wickenburg, incl. 70,350 cu.yd. roadway excav. T. S. O'Connell, state hy. engr.

Arizona—Feb. 4, by State Hy. Dpt., Phoenix, grading, draining 2 mi. Safford-Bowie Hy., Graham Co. $50,000. T. O'Connell, state hy. engr.

California—State Hy. Comn., State Bldg., Los Angeles, rejected bids Dec. 5, grading 3.7 mi hy. between San Fernando Rd. and Grand Blvd., Los Angeles Co. Noted Dec. 13, C. D.—Nov. 28, E. N.-R.

California—Feb. 6, by State Hy. Comn., State Bldg., Los Angeles, grading 3.7 mi. Sepulveda Blvd. between San Fernando Rd. and Brand Blvd., Los Angeles Co. C. H. Purcell, P. Wks. Bldg., Sacramento, engr.

Delaware—Feb. 5, by State Hy. Dpt., Dover, 4 ft. concrete widening and 3 concrete bridges on 5.41 mi. Blackbird-Middletown Rd., Contr. 458, New Castle Co.; improving 4.395 mi. Summitt Bridge-Glasgow Rd., Contr. 326; 5.07 mi. Maryland line-Glasgow Station Rd., Contr. 339 X, improving Newport-Boxwood Rd., Contr. 471, all foregoing in New Castle Co.; 12.571 mi. Georgetown-Laurel Rd., Contr. 416, Sussex Co.; Wm. Penn School-Buttonwoods Rd., Contr. 472.

Idaho—Jan. 31, by G. E. McKelvey, comr. P. Wks., Boise, grading, drainage and crushed rock surfacing 3.15 mi. Elk River Hy. between Emerald Creek and Clarkia, Shoshone Co., incl. 9,300 cu.yd. solid rock and 52,000 cu.yd. common rock excav.; 2.723 mi. Lenville-Cornwall Rd., Lenville North, Latah Co., 20,000 cu.yd. overhaul on excav.; constructing roadbed and crushed graveling 1.367 mi. Coeur d'Alene-Yellowstone Trail, from Mullan-east in Shoshone Co., 33,000 cu.yd. unclassified and 1,000 cu.yd. structural excav.

Ill., Chicago—Dpt. P. Wks. & Bldgs., Div. Hys., Springfield, withdrew bids to have been opened Jan. 20, concrete paving 8.7 mi. and bituminous surfacing 24.8 mi. roads in Cook Co. Work indefinitely postponed. Noted Jan. 15, C. D.

Indiana—Feb. 4, by State Hy. Comn., J. D. Adams, chn., Indianapolis, rein.-con. paving 0.05 mi. State Rd. 24 (gap at underpass to P. Ft. W. & C. R. R. in Fort Wayne), Allen Co.; and bituminous retread paving 1.904 mi. State Rd. 140, Knightstown South to Orphans Home, Knightstown, Rush and Henry Counties. M. R. Keefe, state hy. engr.

Louisiana — Feb. 5, by State Hy. Comn., Baton Rouge, grading, gravel surfacing 4.374 mi. Belle Bowe-Logansport Hy., Route 1322, Project 854-C, De Soto Parish. $23,000.

Louisiana—Feb. 12, by State Hy. Comn., Baton Rouge, H. B. Henderlite, state hy. engr. **(P. means Project)**, grading, gravel surfacing hys. Group 3, P. 1145, Tensas Parish; 8 mi. Meredith-Shady Grove Hy., Route 413 P. 1144, Winn Parish; 5.534 mi. Springhill-Southwest Hy., Route C-1434, P. 1143, Webster Parish; 7.5 mi. Dido-Intersection Route 151, Route 498, P. 1142, Vernon and Allen Parishes; 6.5 mi. hys. Group 1, Routes 909-910 and C-1433, P. 1141, St. Mary Parish; 3 mi. Intersection Route 401-Iberia Parish line Hy. on Route 940, P. 1140; 8 mi. Washington-Randall Hy., Route 778, P. 1139, both St. Martin Parish; 8 mi. Aloha-Old Verda Hy., Route C-1432, P. 1138, Grant Parish; 8.8 mi. Bethel Church-Westport Hy., Route C-1414, P. 1099, Rapides Parish; 3.925 mi. Athens-Marsalis Hy., Route 489, P. 1094, Claiborne Parish; 5.7 mi. Shell Beach-Ycloskey-South Hy., Route 32 and C-1389, P. 1067, St. Bernard Parish; 4.676 mi. Transylvania-Waddill Hy., Route 155, P. 1057, East Carroll Parish; 7.68 mi. Slidell-Intersection-Route C-1334, Route 1075, P. 1036, St. Tammany Parish; 5 mi. Mt. Pleasant-Wardville Hy., Route C-1341, P. 1137, Morehouse Parish; 3.711 mi. Grangeville-Intersection Route 103, Route 1223, P. 945-A-1, St. Helena Parish; 7.68 mi. Slidell Intersection with Route C-1334, Route 1075, P. 1036, St. Tammany Parish.

Louisiana — Feb. 26, by **State Hy.** Comn., Baton Rouge, H. B. Henderlite, state hy. engr., grading, gravel surfacing 2 mi. factory Rd. on Route C-1440, Project 1163, St. Tammany Parish, $10,000; 2.8 mi. Intersection Route 170-Intersection Route 506 Hy. on Route 506, Project 969-A, Assumption Parish, $13,000; 5.19 mi. Jena-Aimwell Hy., Route 1010, Project

†Federal Government.

Streets and Roads (Continued)

841-A, La Salle Parish, $26,000; 1.5 mi. Intersection Route 299-Grand Ecore Hy., Route 1212, Project 1162, Avoyelles Parish, $7,500; 3 mi. Intersection Route 8-Kennonwood Hy., Route C-1439, Project 1161, Caddo Parish, $15,000; 7.5 mi. Darnell-Richland Parish Line Hy., Routes 592 and 207, Project 1160, West Carroll Parish, $37,000; 5 mi. Eros-Indian Village Hy., Route 1303, Project 1159, West Carroll Parish, $25,000; 2 mi. Gansville-East Hy., Project 1158, Winn Parish, $10,000; 2.5 mi. Bayou Des Glaises Rd., Route 1217, Project 1157, Avoyelles Parish, $12,500; 1 mi. Richland-Polland School Hy., Route C-1438, Project 1156, Rapides Parish, $5,000; 6.794 mi. Loranger-Husser Hy., Routes 407 and 408, Project 979-A, Tangipahoa Parish, $33,000; 5 mi. Intersection Route 77-Bayou-Chegby Hy., Route 486, Project 974-A, Lafourche Parish, $25,000.

Massachusetts—Jan. 28, by Comonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston, bituminous macadam or penolithic paving 16,487 ft. F.A. Project 1936, Bourne, to exceed $150,000; bituminous macadam or phenolithic type paving 23,100 sq.yd. and Class 1 bituminous concrete sidewalks, 4,360 sq.yd. F.A.P. W.P.M.S. 267, Lynn, to exceed $35,000

Minnesota—State Hy. Dpt., St. Paul, withdrew bids from Jan. 17 opening for improving 7.8 mi. State Project 17-17-29-1A, and S.P. 17-17-29-2A, B, C WPGH 571-A, WPH 571-B, WPMH 571-C, WPH 78B, WPGH Cottonwood-Hanley Falls Rd., incl. 266,781 cu.yd. excav.; 4.2 mi. S.P. 60-85-22-2V, WPGH 523A, between Worthington and point 2 mi. southwest of Brewster, incl. 291,220 cu.yd. excav. Noted Jan. 10, C. D.

Minnesota—Feb. 4, by State Hy. Comn., St. Paul, grading 8.2 mi. State Project 11-11-37-3C, FAP 400H, between Frontier-Birchdale Rd., incl. 242,428 cu.yd. excav.; 6.7 mi. S.P. 230185-21-2C, FAP 5031, between Kerrick and north county line, 269,204 cu.yd. excav.; 10 mi. S.P. 71-4-52-2 FAP 13R and R, between Junction Trunk Hy. 14 and 1 mi. east of Towena, 191,185 cu.yd. excav.; 9 mi. S.P. 212-155-21-2 FAP 506B, between West States Line and 9 mi. east, 169,427 cu.yd. excav.

New Jersey—Feb 3, by D. Sterner, comr. State Hy. Comn., Trenton, grading, paving 2.125 mi. Route 25, Sects. 2A and 3A Crystal Lake to Bordentown, Burlington Co., incl. 62,000 cu.yd. unclassified roadway excav., 32,992 sq.yd. 10 in. rein.-con. pavement, 1,175 sq.yd. 10 in. plain concrete pavement; grading, rein-con. paving 70,500 sq.yd. Route 25, Sect. 26, Robbinsville to Hightstown, Mercer Co., bids Dec. 4 rejected. Noted Nov. 27, C. D.

North Carolina—Jan. 28, by State Hy. & P. Wks., Raleigh, (**P. means Project**), grading, sand bitumin, road mix, surfacing and structures 6.61 mi. P. 145, Martin Co.; concrete widening 0.78 mi. P. 1861, Pitt Co.; 0.85 mi. P. 1549, Martin Co.; grading, structures, artificial sand clay surfacing 9.76 mi. P. 2320, Greene and Pitt Counties; concrete paving and underpass 0.34 mi. hy. in Roxboro, P. 4643, Person Co., $63,500; approaches and underpass, 1.05 mi. P. 4470, Lee Co., $108,000; approaches and underpass under S.A.L. and Southern R.R., 4.15 mi. P. 4822, Wake Co., $85,000; grading, structures, t.b. macadam surfacing 4.22 mi. P. 5565, Montgomery Co.; overhead crossing over Southern R.R., 0.04 mi. P. 6151, Rowan Co., $60,000. Total est. $456,200. W. V. Baise, Raleigh, engr.

†North Carolina—Feb. 13, by Pub. Rds., Dpt. Agriculture, Shenandoah Life Insurance Bldg., Roanoke, improving 8.178 mi. road in Shenandoah-Great Smoky Mountains Parkway from Benge Gap to Deep Gap, Ashe, Wilkes and Watauga Counties, incl. 457,000 cu.yd. excav. H. J. Spelman, dist. engr.

North Dakota—Jan. 31, by State Hy. Comn., Bismarck, grading, structures 12.734 mi. east and west of Lake Metigoshe, NRS 538, Bottineau Co., incl. 268,000 cu.yd. unclassified excav., $65,000; 1.046 mi. overhead crossing structure and approaches southeast of Washburn, McLean Co., 16,758 cu.yd. excav., $28,500; graveling 4.064 mi. south of Fillmore, NRS 553, Benson Co., $12,300; oil mix surfacing 0.708 mi. in New Rockford, Eddy Co., $14,500.

North Dakota—Jan. 31, by State Hy. Comn., Bismarck, grading, stabilized gravel and oil mix surfacing 7.17 mi. state highway west of Taylor, NRH 260H, Unit 2, Stark Co., W. J. Flannigan, hy. comr.

Ohio—J. J. Jaster, Jr., State Hy. Dir., Columbus, received no bids Jan. 7, grading, drainage structures Bethel-Chilo Rd. Clermont Co.*** only one bid received for grading, drainage structures, part Sect. C. Ohio River Rd., Lawrence Co.***cancelled bids to have been opened Jan. 7, grading, draining Sect. C. Maumee Northern Rd.***rejected bids Jan. 7. grading Celina-Wabash Rd., Mercer Co.

Ohio—Feb. 4, by J. J. Jaster, Jr., State Hy. Dir., Columbus, grading, drainage structures, concrete paving 0.262 mi. over Black River Part Sect. A-3, Sheffield Village, Lorain Co., $29,843***constructing deck plate girder viaduct on steel bents and towers, 5 sets 3 continuous spans 68, 85, 68 ft. between 2 towers with two 8.5 ft. cantilevers over each tower, one 119 ft. span and one 76.5 span, incl. 2,432,000 lb. structural steel, 7,500 lb. steel castings, 4,175 cu.yd. excav., 2,439,530 cu.yd. field painting (2 coats) Sect. Cleveland Lorain Rd., State Hy. 555, Route 254, Sheffield Twp., Lorain Co., $264,502*** grading, drainage structures, traffic bound surface course paving 0.045 mi. Sect. 1, Bethel Chilo Rd. State Hy. 257, Route 222, Clermont Co. $8,560.

Ohio—Feb. 11, by J. J. Jaster, Jr., State Hy. Dir., Columbus, grading, drainage structures, cold mixed, cold laid concrete paving 2.943 mi. Sect. B-1 part Marysville Sect. Marysville-Kenton Rd., State Hy. 228, U. S. Route 31, Union Co., $124,464***grading, drainage structures, improving roadside, salvaged brick paving 2.646 mi. Sect. M part Sect. P Youngstown-Warren Rd., State Hy. 80, Route 422, Trumbull Co., $294,640.

Okla., Oklahoma City—Feb. 4, by City, M. Peskek, clk., grading, concrete paving 7,140 sq.yd. North Shartel St. $26,110. L. M. Bush, city engr.

Pennsylvania—Jan. 31, by P. M. Tebbs, for W. Van Dyke, secy. hys., Harrisburg, bituminous on crushed aggregate base surfacing, rein.-con. bridge 450 ft. R-258, Sect. 1, Cambridge Twp., Crawford Co., involving 275 cu.yd. Class 1, 122 cu.yd. Class 2, 532 cu.yd. borrow excav.; rein.-con. paving 2,231 ft. R-35-5, Sect. 1, Old Forge Borough, Lackawanna Co., 2,520 cu.yd. Class 1, excav.; rein.-con. paving and plate girder overpass bridge 2,250 ft. R-238, Sect. 6, Pymatuning Twp., Mercer Co., 166 cu.yd. Class 1, 2,692 cu.yd. Class 2 and 83,795 cu.yd. borrow excav.; rein.-con. paving 879 ft. and bituminous on native stone or modified crushed aggregate surfacing 259 ft. R-120, Sect. 11-C, Hempfield Twp., Westmoreland Co., 341 cu.yd. Class 1, 2,090 cu.yd. Class 2 excav., 1,227 cu.yd. borrow excav.

Rhode Island—Jan. 27, by State, Providence Plantations and Division of Contracts, Standards and Purchases, sheet asphalt Class "J" on 7 in. concrete base course with crack control 1.349 mi. section of state hy. in city of Cranston and town of West Warwick, Providence and Kent Counties, Contr. 3510, WPH R-5 and R-77; sheet asphalt, Class "J" on 7 in. concrete base paving with crack control paving 1.184 mi. section of hy. in Pawtucket, Providence Co., Contr. 3517; sheet asphalt paving Class "J" on concrete paving 0.16 mi. section hy. in City of Central Falls, Providence Co., Contr. 3514.

Vermont—State Hy. Dpt., H. E. Sargent, ch. engr., Montpelier, rejected bids Jan. 10, gravel mixed in place surface course with refined tar surfacing 0.1 mi. F.A.P. 196-A, Milton. Noted Jan. 16, C. D.

†Washington—Pub. Rds., Post Office Bldg., Portland Ore., soon takes bids improving 3.724 mi. Stillaguamish Hy., 60 to 100 ft. wide, Snohomish Co. W. H. Lynch, dist. engr.

Wisconsin—Feb. 4, by State Hy. Comn., Madison, grading, draining, graveling 12.004 mi. Milton-Johnstown Center-East County Line Rd., Trunk Hy. M. W.P.S.O. 674-A and W.P.M.S. 674-B, Rock Co., incl. 20,085 cu.yd. common excav.; graveling 15.285 mi. Beloit-Shopiere Rd., Janesville-Beloit, W.P.S.O. 676-A, W.P.M.S. 676-B, W.P.M.S. 715, Rock Co.; 7.787 mi. Marinette-McCallister Rd., County Trunk Hy. C, W.P.S.O. 601-A and W.P.M.S. 661-B, Marinette Co.; 3.085 mi. Junction City-Dancy Rd., State Trunk Hy. 34, W.P.S.S. 622, Portage Co.; 7.787 mi. Marinette-McCallister Rd., County Trunk Hy. C, W.P.S.O. and W.P.M.S. 661-A, Marinette Co., incl. 123,519 cu.yd. excav.; 3.086 mi. Junction City-Dancy Rd., State Trunk Hy. 34, W.P.S.S. 622, Portage Co., 42,043 cu.yd. excav.; 0.589 mi. Schofield subway improvement, Stevens Point-Wausau Rd., Marathon Co., 16,676 cu.yd. excav.; 1.557 mi. Almond-Spirit Land School Rd., County Trunk Hy. A, Portage Co., 31,603 cu.yd. excav.; graveling or crushed stone surfacing 4.401 mi. Fountain City-Cochrane-Alma Rd., State Trunk Hy. 35, Buffalo Co., 166,961 cu.yd. excav.; grading, draining, shale surfacing 1.714 mi. Whitehall-Ettick Rd., County Trunk Hy. D, Trempealeau Co., 27,212 cu.yd. common and 1,955 cu.yd. rock excav.; 5.315 mi. Menomonie-Elk Mound-Eau Claire Rd., Elk Mount Eau Claire Rd., Eau Claire Co., 25,042 cu.yd. common and 1,462 cu.yd. rock excav.; 3.751 mi. Bryant-Lily Rd., County Trunk Hy. E, Langlade Co., 90,458 cu.yd. common and 4,717 cu.yd. rock excav.; 2.685 mi. Sinter Lake-Chippewa Rd., Winter County Hy. B, Sawyer Co., 42,944 cu.yd. common and 850 cu.yd. rock excav.

Wisconsin—Feb. 4, by State Hy. Comn., Madison, grading, draining, concrete surfacing 1.695 mi. Fond du Lac-Sheboygan Rd., T. H. 57, Sheboygan Co., incl. 33,969 cu.yd. common excav.

Wyoming—State Hy. Comn., Cheyenne, rejected bids Jan. 14, grading, drainage, surfacing, 4 rein.-con. culverts, 2 treated timber bridges on 12.488 mi. Torrington-Cherry Creek Rd., Goshen Co.

CONTRACTS AWARDED

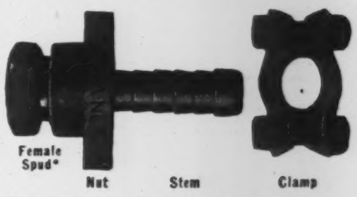
★ **Alabama**—State Hy. Comn., Montgomery, rein.-con. paving 0.631 mi. Birmingham-Bessemer Rd., NRM 57-Ext. and 1, Jefferson Co., to Sullivan, Long & Haggerty, Bessemer, $63,050***grading, surfacing, draining, and steel, concrete overhead, 0.58 mi. Forrest Ave., Gadsden, WPGM 104-ABCD and Ext., Etowah Co., to H. E. Wolfe, St. Augustine, Fla., $84,943 ***grading, draining, temporary surfacing 1.393 mi. Forrest Ave., Gadsden and Attalla, WPMH 104-ABCD and Ext. and H19 and Ext., Etowah Co., to Dunn Constr. Co., Chamber of Commerce Bldg., Birmingham, $65,315, both fore-

Constr. News page 53

---

†Federal Government.

"DIXON"
AIR HAMMER COUPLINGS



*Also furnished with male spud

—are made to stand the hard service on

Hand Hammers and Rock Drills

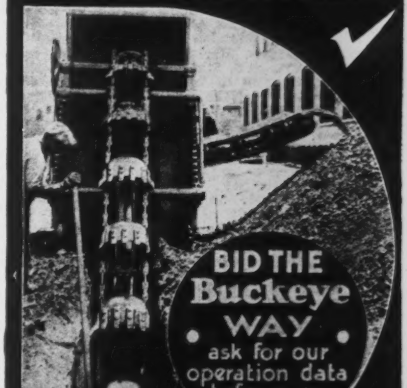
"Dixon" Air Hammer Couplings are designed and built to withstand the continual vibration of the drill in trench digging, subway work or pavement breaking without the danger of blowing-off or power loss through leakage. These couplings are cadmium plated and rust-proof and will prove most economical in use.

Carried in stock by leading Rubber Manufacturers and Jobbers

IF IT'S A "DIXON" PRODUCT IT'S DEPENDABLE

DIXON
VALVE & COUPLING CO.
PHILADELPHIA
LOS ANGELES HOUSTON

SHIFT THE BOOM
—DIG ANYWHERE


✓
BID THE
Buckeye
WAY
ask for our operation data before you bid
DIGS 75% OF ALL DITCHING JOBS

WITH A

Buckeye
MODEL 160 DITCHER

Dodge obstructions, get close
to curbs, poles and buildings,
maneuver in close quarters.

THE BUCKEYE TRACTION DITCHER CO.
FINDLAY, OHIO

Streets and Roads (Continued)

going bids Nov. 8***grading, draining, gravel surfacing, timber bridge on 3.232 mi. Brewton-Dixonville Rd., WPSS 371, Escambia Co., to Hooper Constr. Co., Bunnell, Fla., $84,468, bids Nov. 27***grading, draining, temporary surfacing 2.54 mi. Birmingham-Bessemer Rd., to MacDougald Constr. Co., Hemphill Ave., N. W., Atlanta, Ga., $214,096, bids Dec. 13***grading, draining, concrete bridges 2.111 mi. Birmingham-Bessemer WPMH 57-3, Jefferson Co., to Mitchell Bros., 3828 1st Ave. South, Birmingham, $158,-460. Bids Oct. 18. Grand total $511,872. Noted Nov. 19, C. D., Dec. 13 and 27, C. D.

Alabama—State Hy. Comn., c/o G. Scott, dir., Montgomery, double bituminous surface treating 5.659 mi. Montgomery-Luverne Rd. near Fullers Cross Rds., W.P.H. 61-1 and 112-A, and 5.009 mi. Montgomery-Luverne Rd. near Highland Home, W.P.H. 61-2, Crenshaw Co., to Hardaway Constr. Co., Columbus, Ga., $75,377 and $61,343 respectively. Noted Dec. 11, C. D. —Dec. 19, E. N.-R.

Alabama—State Hy. Comn., c/o G. Scott, pres., Montgomery, double bituminous surface treatment on 1.836 mi. Andalusia-Opp Rd., WPH-36, Covington Co., to Hardaway Contg. Co., 15 11th St., Columbus, Ga., $68,134.

Arizona—State Hy. Comn., Phoenix, improving Prescott-Jerome Hy., to Pearson & Dickerson Constr., Inc., Box 471, Prescott. Bids Dec. 6. Noted Nov. 29, C. D.

Arizona—State Hy. Comn., Phoenix, grading, draining, 9.6 mi. road Navajo and Apache Counties, to Lee Moor Contg. Co., 206 Two Republics Bldg., El Paso, Tex., $107,856. Bids Jan. 3. Noted Dec. 26, C. D.

Arizona—State Hy. Comn., Phoenix, widening, 6.3 mi. road in Maricopa Co., to Arizona Sand & Rock Co., 1500 South 7th St., Phoenix, $113,-614 est. $148,000; 4.2 mi. road in Gila Co., to Bennett & Taylor, Phoenix, $36,137. Bids Oct. 25. Noted Oct. 15, C. D.—Oct. 17, E. N.-R.

California—State Hy. Comn., Sacramento, grading, constructing bridge 6,3 mi. hy. between St. Helena and Larkmead Station, Napa Co., and grading, road mix surfacing on selected material base, constructing bridge 3.1 mi. hy. between Bear Valley and point 1 mi. north of Willow Creek, San Benito Co., to Union Paving Co., Call Bldg., San Francisco, $67,525 and $85,188 respectively. Bids Dec. 11, awarded Jan. 7. Noted Dec. 30, C. D.

California—State Hy. Comn. at office C. H. Purcell, state hy. engr., State Bldg., Los Angeles, grading, constructing steel stringer bridge 2.2 mi. hy. between Camp Bonita and Fellows Camp, Los Angeles Co., to G. F. Atkinson Co., Russ Bldg., San Francisco, $355,762. Bids Dec. 19, awarded Jan. 14. Noted Jan. 3, C. D.

California—C. H. Purcell, state hy. engr., 808 State Bldg., Los Angeles, grading, concrete paving 1.3 mi. hy. between Delhi Rd. and Fairview Ave., etc., Orange Co., to C. F. Robbins, 307 West 8th St., Los Angeles, $42,487. Bids Dec. 13, awarded Jan. 14. Noted Dec. 31, C. D. —Dec. 5, E. N.-R.

California—C. H. Purcell, hy. engr., 808 State Bldg., Los Angeles, grading, liquid asphalt treating and constructing timber pile trestle 10.9 mi. hy. between point 10 mi. west of Indio and Indio, Riverside Co., to Sharp & Fellows Contg. Co., Central Bldg., Los Angeles, $129,848. Bids Dec. 27, awarded Jan. 14. Noted Jan. 7, C. D.

California—State Hy. Comn., C. H. Purcell, state hy. engr., 808 State Bldg., Los Angeles, grading, application of road mix surface treating, etc. 4.7 mi. State Hy. west boundary of county to Route 59, San Bernardino Co., to Basich Bros., Torrance, $130,917. Bids Dec. 12. Noted Dec. 18, C. D.

Colorado—State Hy. Dpt., Denver, gravel surfacing 8.017 mi. hy. between Matheson and Ramah, on State Hy. 4, El Paso and Elbert Counties, to Owen-Baab & Thorkildson, 1555 Monoca Blvd., Denver, $167,442. Bids Dec. 31, awarded Jan. 8. Noted Jan. 10, C. D.

Connecticut—State Dpt. Hys., J. A. Macdonald, hy. comr., Hartford, grading, drainage 12,744 ft. hy. from North St., Greenwich, to Rocky Craig Rd., Stamford, (Merrit Parkway), to Daniel Deering Co., 209 Main St. Norwalk, $279,294. Bids Jan. 13, awarded Jan. 14. Noted Jan. 15, C. D.

Illinois—Dpt. P. Wks. & Bldgs., Div. Hys., Springfield traffic bound surfacing 2.2819 mi. Sect. 451-X-MFT and 8.2614 mi. Sect. 302-MFT near Oakley, both Macon Co., to Birt Bros. Constr. Co., Decatur, $14,631 and $38,033 respectively.

Illinois—Dpt. P. Wks. & Buildings, Div. Hys., Springfield, to R. P. Devine, Watseka, concrete paving 1.233 mi. Sect. 106-15d, $19,346; 2.114 mi. Sect. 107-15d, both near Fountain Creek, $35,311, 1.2121 mi. Sect. 111-15d, near Goodwine, $19,043, all foregoing Iroquois Co. Grand total $73,700.

Indiana—State Hy. Comn., Indianapolis, macadam paving 6.201 mi. Fulton, Marshall and Kosciusko Counties, to Bontrager Constr. Co., 618 Indiana Ave., Elkhart, $106,313 est. $121,-443; waterbound macadam and crushed stone paving 9.473 mi. Whitley Co., to Tri-Lake Constr. Co., Columbia City, $98,327 est. $101,-728. Bids Dec. 3.

Indiana—State Hy. Dpt., Indianapolis, crushed stone surfacing 7.372 mi. Greene Co., to General Dredging Co., 2511 Taylor St., Fort Wayne, $98,021 est. $129,829; bituminous retread surfacing 4.854 mi. Brown Co., to Ralph Rogers Co., South High St., Bloomington, $214,649 est. $260,481. Bids Dec. 3. Noted Dec. 10, C. D. —Nov. 28, E. N.-R.

Kansas—State Hy. Comn., at office of County Clerk, Cottonwood Falls (**P. means Project**), to M. E. Gillioz, Monett, Mo., earthwork and culverts, and concrete paving 6.013 mi. P. 50S-28-FA 357-B, Part 1, $225,259; 1.861 mi. P. 50S-28-FA 357-B, Part 2, $87,385, both Chase Co.***to D. L. Wheelock Constr. Co., Clay Center, earthwork and culverts 1.312 mi. P. 40N-23-WPH 284G, Clay Co., $25,017***to G. Stannard, Wichita, sand gravel surfacing 9.5 mi. P. D-50S-28-8079, Chase Co., $5,387***to San Ore Constr. Co., McPherson, 8.6 mi. P. 9-17-6667, Clay Co., $1,823; 5.8 mi. P. 9-16-6666, Washington Co., $1,124; 1.4 mi. P. 9-15-6660, Cloud Co., $297; 15.9 mi. P. 36-21-6661, Republic Co., $4,420; 11.5 mi. P. 36-22-6662, Washington Co., $3,381. Grand total $354,-093. Bids Jan. 3. Noted Dec. 27, C. D.

Kansas—State Hy. Comn., at office of County Clerk, St. Francis (**P. means Project**), earthwork and culverts 5.01 mi. P. 183-1B-FA 462-A, Decatur Co., to Perry Constr. Co., Selden, $41,505***earthwork, culverts, light type surfacing 0.227 mi. P. 83-22-WPGM 343-F, Norton Co., to I. Rogers, Topeka, $5,411***earthwork, culverts, curbing, guttering, concrete paving 0.252 mi. P. 36-9-A-WPMH 345-F, Norton Co., and light type surfacing 5.707 mi. P. 9-1A-WPSS 512-A, Sheridan Co., to San-Ore Constr. Co., McPherson, $24,051 and $8,384 respectively***6.35 mi. P. 18-3-FA 340-F, Rooks Co., to D. H. Hardman, Alton, $8,548 ***earthwork and culverts 6.93 mi. P. 23-15-FA 494-D, Sheridan Co., to H. J. Hall Constr. Co., Manhattan, $32,789***earthwork 0.16 mi. P. 1-14-PWS 80, Ellis Co., to Sherwood Crane Service Co., Wichita, $3,879***sand gravel surfacing 13.3 mi. P. 8-15-6693, Russell Co., to C. Hulmen, Great Bend, $4,002. Grand total $128,569. Bids Jan. 7. Noted Dec. 27, C. D. —Jan. 2, E. N.-R.

Kansas—State Hy. Comn. at office of County Clerk, St. Johns, (**P. means Project**), to Cook & Waddell, Ottawa, earthwork and culverts 3.159 mi. P. 17-2-FA 395-C, Reno Co., $11,617 ***to List & Clark Constr. Co., Railway Exchange Bldg., Kansas City, Mo., 0.573 mi. P. 77-2-WPGH 231 G, $46,607; 0.089 mi. P. 77-2-WPH 231 G. $864, both Cowley Co.***to Scherrer & Bennett, 645 Minnesota St., Kansas City, Mo., 6.634 mi. P. 8-9-FA 452 F, $30,512; 6.767 mi. P. 8-9-FA 452 G, $31,382; 5.554 mi. P. 8-10-FA 452 H, $21,227, all foregoing in Stafford Co.***to J. Coffey, Junction City, 3.995 mi. P. 806-FA 508 C, Pratt Co., $23,818*** to A. L. Cook, Ottawa, earthwork, culverts, concrete paving 0.344 mi. P. 77-3-FA 230 G, $22,-064; earthwork, culverts, concrete paving, bit. filled brick paving 0.373 mi. P. 77-3-WPMH, $46,998 both in Cowley Co.***to H. J. Taylor Constr. Co., Salina, earthwork, culverts, concrete paving 0.486 mi. P. 50S-12-NRM 115 C, Part 1, $23,024; 0.259 mi. P. 1-6C-NRM 115 C, Part 3, $10,510; 0.504 mi. P. 45-11A-NRM 115 C, Part 2, $36,354, all foregoing Edwards Co. ***to R. G. Aldridge, 1609 Nebraska St., Kansas City, 0.561 mi. P. 96-25-WPGH 396 B, Butler Co., $44,554***to M. W. Watson, Natl. Bank of Topeka Bldg., Topeka, light type surfacing 5.91 mi. P. 54-13-WPSS 489 B, Kiowa Co., $6,694*** to Stewart & Ritchie, Wichita, earthwork, concrete paving 0.169 mi. P. WPMS 506 B, Sedgwick Co., $5,373***to G. H. Stannard, Wichita, sand gravel surfacing 8 mi. P. 160-28-8083, Sumner Co., $1,440***to Imperial Constr. Co., Leavenworth, concrete paving 0.558 mi. P. 81-3A-WPMH 368 E2, Sumner Co., $20,445***to Independent Constr. Co., Pittsburgh, 0.135 mi. P. 77-8-WPMH 249 E, Butler Co., $11,752*** to Koss Constr. Co., Des Moines, Ia., 0.678 mi. P. 50 S-20-WPMH 399 H, Reno Co., $55,297. Grand total $449,532. Bids Jan. 4.

Kansas—State Hy. Comn., at office of County Clerk, Marysville (**P. means Project**), to Cook & Ransom, Ottawa, earthwork, culverts, concrete paving 0.216 mi. P. 75-22-WPH 264-F, Part 1, $3,467; 0.27 mi. P. 75-21-WPH 264-F, Part 2, $5,685; 0.559 mi. P. 75-22-WPGH 264-F, $44,604, all foregoing in Osage Co.*** to B. H. Cotter, Pittsburg, earthwork and culverts 0.359 mi. P. 10-10A-WPGH 58-C, Shawnee Co., $45,584***to Co-Operative Surfacing Co., Topeka, sand gravel surfacing 5.3 mi. P. 11-17-6686, $726; 15.4 mi. P. 4-22-6685, $2,110, both Wabaunsee Co. Grand total $102,176. Bids Dec. 31. Rejected bids Dec. 31, improving hys. in Marshall Co. Noted Dec. 17, C. D. —Dec. 19, E. N.-R.

Mich., South Haven—At office of City Clerk, grading, curbing, paving 4 streets, to West Michigan Constr. Co., South Haven, $63,931. **P.W.A.** Bids Dec. 20. Noted Jan. 7, C. D.

Mississippi — E. D. Kenna, dir. State Hy. Comn., Jackson, grading, alternate types surfacing 10.297 mi. Hattiesburg-Gulfport Hy., NRH 160 B and C, Harrison and Stone Counties, to West Constr. Co., Riverside Dr., Chattanooga, Tenn., $135,814. Est. $16,000. **P.W.A.** Noted Nov. 15, C. D.

New Jersey—State Hy. Comn., Trenton, constructing 3.349 mi. Route 34, Sect. 5, from Route 35 to New Bedford Rd., Monmouth Co., incl. 163,921 cu.yd. unclassified roadway and 3,780 cu.yd. wet excav., to S. J. Grove & Sons Co., Ridgefield, $345,113. Bids Jan. 6, awarded Jan. 7. Noted Dec. 19, C. D.—Dec. 26, E. N.-R.

New York — See "Bridges and Grade Crossings."

N. Y., New York—S. Levy, pres. Manhattan Boro, Municipal Bldg., sheet asphalt paving 22nd St. and Marie Curie Aves, to C. D. Beckwith, Inc., Seneca Ave. and Edgewater Rd., $1[illegible]-433 and $33,000 respectively***asphalt block repaving 98th St., to Harlem Contg. Co., [illegible] 9th Ave., $46,666. Grand total $97,000. Bids Dec. 27. Noted Dec. 17, C. D.—Dec. 26, E. N.-R.

Ohio—J. J. Jaster, Jr., State Hy. Dir., Columbus, grading, drainage structures and brick paving 2.993 mi. Athens Co., to Beightler & Hussey Co., 297 South High St., $185,272 est. $207,631***grading, drainage structures, concrete paving 4.236 mi. Miami Co., to Davis-Hydaker Co., Spencerville, $70,919 est. $79,113 ***Montgomery Co., to Miller & Orndoff, Waterford, $76,454 est. $89,220***grading, drainage structures, bituminous surfacing 1.349 mi. Wyandot Co., to Launder & Son, Inc., Box [illegible], Station E, Toledo, $78,696 est. $89,171. Grand total $411,341.

Oregon—State Hy. Comn., Portland, grading, concrete surfacing 2.09 mi. Grays Co., William Rock Hy., Lane Co., to E. C. Hall, Eugene, $36,362; 6 mi. Ambry-Eugene Section Junction City Hy., Lane Co., to I. Rehner & Rigdon, Barlow, $89,142. Bids Nov. 31.

Oregon—State Hy. Comn., Salem, rock production project for West Lake-Mohler Rock Production Project, to Saxton & Looney and J. S. Risley, Bway. Bldg., Portland, $25,795*** overcrossing at Lakeview Klamath Falls, near Dairy, to E. E. Philpot, Portland, $38,829. Rejected bids Jan. 9, grading road in Klamath Co. and bridge in Clackamas Co. Bids Jan. 9. Noted Dec. 30, C. D.

Texas—G. Gilchrist, state hy. engr., Austin, grading, drainage structures, salvaged base caliche and limestone base with bituminous surface course paving 6.733 mi. State Hy. 5, WPMH-162-N and F, Potter Co., and 11.257 mi. State Hy. 5, WPMH-162-D and E and 523-A, both Potter Co., to Cocke & Braden, Marshall, $66,544 and $189,304 respectively, est. $80,000 and $160,000 respectively. New **P.W.A.** Bids Dec. 3. Noted Dec. 11, C. D.

Tex., Houston—Harris Co., c/o H. L. Washburg, aud., grading, drainage structures, surfacing 2.516 mi. Laura Coppy Rd., to Gulf Bitulithic Co., 2820 Polk Ave., $15,690 est. $17,-500***reconditioning base and single bituminous surfacing, and remodeling bridge over White Oak Bayou on 18th St. Rd. and grading, drainage structures, surfacing 5.579 mi. Steuer Airline Rd., to H. Hedges, 1910 Runnels St., $26,-480 and $39,189 respectively, est. $26,000 and $40,000 respectively***grading, drainage structures and single bituminous surface treating 5.204 mi. Friendswood Rd., to Brown & Root, Inc., 4300 Calhoun Rd., $64,550, est. $61,000. Grand total $145,909. Noted Dec. 18, C. D.

Utah—State Hy. Comn., Salt Lake City, concrete, bituminous concrete or rock asphalt surfacing 2.938 mi. road in Utah Co., to Strong & Grant, Springville, $157,732 est. $142,189 ***graveling 1.15 mi. Carbon Co., to J. M. Sumsion, Springville, $59,001 est. 74,535***3,804 mi. Utah Co., to W. W. Clyde & Co., Springville, $38,043 est. $39,795***8.336 mi. Duchesne Co., to Northwestern Eng. Co., Rapid City, S. D., $62,985 est. $82,050***2 underpasses and approach road in Box Elder Co., to T. G. Rowland, 1558 Yale Ave., Salt Lake City; $180,113 est. $170,102. Grand total $497,874. Bids Jan. 10. Noted Jan. 3, C. D.

Vermont—See "Bridges and Grade Crossings."

★ **†Virginia**—Pub. **Rds.,** Richmond, constructing 9.2 mi. Rock Castle Gorge-Route 641, sections Shenandoah Great Smoky Mountains Parkway Floyd and Patrick Counties, to C. A. Ragland, Louisburg, N. C., $213,567***9 mi. Tuggle Gap to Rock Castle Gorge, to C. A. Vilbig, 817 Bourbon St., Dallas, Tex., $234,676 ***9.7 mi. Smart to Tuggle Gap, to W. W. Tuck & Sons, Virgilina, $215,313***8.2 mi. Andy Gap to Pine Spur, Floyd and Franklin Counties, to E. W. Grannis, Fayetteville, N. C., $219,913***8.4 mi. Jarman's Gap to Rockfish Gap, Albermarle and Augusta Counties, to R. E. Mills, Frankfort, Ky., $322,866***Pine Spur Gap to Smart, to T. M. Strider & Co., Cotton States Bldg., Nashville, Tenn., $204,375. Grand total $1,140,710. Awarded in December. Bids Nov. 21, 25, 27 and 29, and Dec. 2 and 6. Noted Oct. 25, Nov. 13, Nov. 27 and Dec. 4, C. D.—Oct. 31, Nov. 21, E. N.-R.

Wash., Everett—City, paving 19th St. from Rucker to Walnut Sts., to E. J. Templeton Co., 2924 Lombard St., $60,886. Noted Jan. 7, C. D. —Jan. 9, E. N.-R.

Wash., Newport—Pend Orielle Co., clearing, grading, draining, screened gravel surfacing [illegible]-380 cu.yd. Sacheen Hy., to P. Carbon & Sons, 716 Mansfield St., Spokane, $49,048. Noted Jan. 14, C. D.—Jan. 16, E. N.-R.

EARTHWORK, IRRIGATION DRAINAGE AND WATERWAYS

PROPOSED WORK

★ **Calif., San Juan Capistrano—R.** Y. Williams, San Juan Capistrano, chn. of a committee to investigate the possibility of forming a water conservation district in San Juan Capistrano and Trabuco Creek areas, such district to ask for an allocation of $700,000 from the federal grant originally allotted to Orange County for flood control work. The district would undertake construction of San Juan Dam, to cost $1,077,980, and Trabuco Dam, $617,500.

†Federal Government

Earthwork, etc. (Continued)

★ **Tex., Gonzales**—Guadalupe River Authority, A. Henne, pres., and L. H. Bridges, secy., Gonzales, plans power dam on Guadalupe River at Canyon Crossing, near New Braunfels; flood control dam on Blanco River, near Wimberly; removal of rafts in San Antonio and Guadalupe Rivers, near Victoria. Est. $500,000.

★ **Wash., Walla Walla**—Mill Creek Flood Control Dist. was formed by vote of people Dec. 31, second election may be called to vote $255,000 in bonds or district directors may issue amounts in warrants. $834,000 allotted in federal funds. $1,089,000. Noted June 21, C. D.—June 28, E. N.-R.

BIDS ASKED

†Arizona—Feb. 5, by Bureau Reclamation, Phoenix, altering spillway of Roosevelt Dam, Salt River Project, incl. 70 cu.yd. excav. for spillway aprons, 610 cu.yd. chipping old concrete, 850 cu.yd. concrete, 2,160 sq.yd. gunite, drilling holes, installing anchor bolts, placing 9,600 lb. reinforcement bars, installing 46,000 radical gate hoists.

†Arizona and California—Feb. 6, by Bureau Reclamation, Yuma, Ariz., constructing earth lining on All American Canal, Stations 419-601 and Stations 803 to 1245, incl. 225,000 cu.yd. compacted and 81,000 cu.yd. uncompacted earth lining.

†Mass., South Boston—Jan. 31, by U. S. Eng., Boston, dredging 40 ft. channel and approach channel to U. S. Navy Department Dock 3, here.

†Minn., St. Paul—Jan. 28, by U. S. Eng., constructing channel markets in pools of Dams 5a and 6, Mississippi River.

†Texas — Feb. 3, by Bureau Reclamation, Austin, clearing Hamilton Reservoir on Colorado River, incl. 15,800 acres.

Tex., Port Arthur—Beaumont Navigation Dist., Goodhue Bldg., Beaumont, taking bids rein.-con. and earth regulating dam in Taylor's Bayou, near here. $70,000. Harrington & Cortelyou, 1004 Baltimore Ave., Kansas City, Mo., engrs.

†T. H., Pearl Harbor—Yards & Docks, Navy Dpt., Wash., D. C., taking bids extending to quay wall, Spec. 8014.

CONTRACTS AWARDED

†Idaho—Bureau Reclamation, Boise, raising Arrowhead Dam, Boise Project, near Boise, to T. E. Connolly, Inc., 461 Market St., San Francisco, Calif., $395,040. Bids Dec. 21. Noted Jan. 3, C. D.—Dec. 12, E. N.-R.

†Idaho — Bureau Reclamation, Boise, constructing 4 tunnels in Black Canyon Canal, Payette Div., to J. A. Terteling & Sons, Boise, $292,415. Bids Dec. 2. Noted Dec. 11, C. D.

★ **†Louisiana**—U. S. Eng., New Orleans, constructing 5,100,000 cu.yd. levee work in West Atchafalaya Basin Levee, to McWilliams Dredging Co., 1021 Hibernia Bank Bldg., New Orleans, $1,830,900. Bids Dec. 30. Noted Jan. 7, C. D.

N. Y., Brooklyn—Dpt. Docks, J. McKenzie, comr., Pier A, foot Battery Pl., New York, removing old structures, dredging, building new piers, piling if required for Sheepshead Bay Improvement, Contr. 2072, to Merritt, Chapman & Scott, 17 Battery Pl., New York, $179,000. Bids Dec. 5, awarded about Jan. 14. **P.W.A.** Noted Dec. 9, C. D.

Tex., Edinburg—Hidalgo Co. Water Control & Impvt. Dist. 6, c/o H. V. Kennedy, secy., horizontal pump for irrigation project, consisting of laying or lining canals, pumping plant, to W. O. Stephenson & Son, Edinburg, $8,000. **P.W.A.** Noted Sept. 19, C. D.—Aug. 1, E. N.-R.

Tex., Fort Worth—Tarrant Co., c/o C. A. Stripling, pres., Fort Worth, improvements to levee system, along clear fork of Trinity River, to Barker Bros., 712 Houston St., $98,466. Est. $150,000. **P.W.A.** Noted Nov. 29, C. D.—July 26, 1934, E. N.-R.

†Tex., Port Aransas—U. S. Eng., Galveston, 4,000 cu.yd. concrete capping jetty on Aransas Pass Jetty, to Scrivner & Richardson, Aransas Pass., $66,400. Bids Dec. 27. Noted Dec. 5, C. D.—Dec. 12, E. N.-R.

†Washington—U. S. Eng., Seattle, dredging 366,000 cu.yd. in Duwamish Waterway, Seattle Harbor, to General Constr. Co., 3840 Iowa Ave., Seattle, $52,338. Bids Dec. 20. Noted Jan. 3, C. D.—Jan. 9, E. N.-R.

UNCLASSIFIED

PROPOSED WORK

Calif., Marysville — AIRPORT — City plans 50x80 ft., steel frame hangar with corrugated iron covering, grading and paving, etc. $35,000. P. J. Diver, city engr.

Mass., Springfield—AIRPORT—City, H. Martens, mayor, City Hall, plans airport. $182,000 funds allocated by Federal Government to defray labor costs for enlarging and improving same. City will purchase materials.

★ **Mich., Jackson** — RURAL ELECTRIFICATION—Consumers Power Co. plans rural electrification in various locations in vicinity of here. $2,000,000.

Minn., Rochester—SWIMMING POOL—City, c/o Park Bd., cancelled bond election to have been held Jan. 21, constructing 60x300 ft. swimming pool and bath house at Soldiers Field. $60,000. P.W.A. project. H. V. Feehan, 1004 Marquette Ave., Minneapolis, engr.

Montana, U. S. A. and Saskatchewan, Canada—GAS PIPE LINE—Prairie Gas & Utilities Syndicate Ltd., G. C. Rooke, pres., Regina, Sask., plans 187 mi. natural gas pipe line from Northern Montana gas fields to various southern Saskatchewan cities and communities. H. R. Davis, Liberty Bank Bldg., Buffalo, N. Y., engr.

Neb., Cedar Bluffs — RURAL ELECTRIFICATION—Nebraska Power Co., 17th and Harney Sts., Omaha, plans constructing rural transmission lines near here. $25,000 or more. F. E. Smith, c/o owner, ch. engr.

Neb., Kearney—DISTRIBUTION SYSTEM—City plans installing city power distribution system, power to be purchased from Sutherland Project. Est. about $150,000. Investigation committee now active. Engineer not appointed.

Neb., Schuyler—PARK—City plans park improvements, incl. sidewalks, swimming pool, golf course, grading and erosion control, covering 45 acre tract of land. $44,538. $10,000 bond issue approved. W.P.A. project. A. D. Moore, W.P.A. dir.

N. Y., Herkimer—PASSENGER STATION—See "Bridges and Grade Crossings."

N. Y., Yonkers — PARK — City, City Hall, plans constructing 19 acre park development near Prescott Street Park, in 5th Ward. To exceed $23,000. C. Sheridan, City Hall, engr.

N. C., Charlotte—STADIUM—City plans completing stadium at Independence Park, incl. concrete bleachers. $51,617. W.P.A. project. D. M. Rea, project engr.

★ **O., Toledo**—DAM—**City**, dam across Maumee River, near **Wabash R. R. docks** on west side and Oregon Rd. on east side, to provide power up river mooring basin water supply reservoir and to provide 2-way lane highway to replace Fassett St. Bridge. $15,000,000. C. Hatch, Court House, engr.

Okla., Oklahoma City—GAS LINE—Phillips Petroleum Co., Bartlesville, made plans constructing 10 in. high pressure gas line on Missouri St. $40,000. A. H. Riney, Bartlesville, engr.

Okla., Oklahoma City—PIPE LINE—British-American Oil Co., 1st Natl. Bldg., Oklahoma City, made plans 13,000 lin.ft. 6 in. oil line from 25th to Kelly Sts. to 10th St. to Eastern Ave. $27,000. E. D. Hill, city engr.

Ore., Portland—AIRPORT—City election Jan. 31, to vote on constructing airport. $300,000.

Pa., Conway — TERMINAL — Pennsylvania R. R., Broad St. Station, plans terminal alteration and extensions. $40,000 or more.

Pa., Genesee—GAS PIPE LINE—G. L. Cabot, Inc., 1st Natl. Bank Bldg., Olean, N. Y., plans constructing natural gas pipe line from Potter Co., Pa., gas field to supply domestic, industrial and commercial users in Genesee. To exceed $23,000. Private plans.

S. D., Aberdeen—AIRWAYS—City, L. W. Kohlhoff, aud., plans constructing improvements at municipal airport, incl. 3 new runways and work on present runways. $45,000. J. G. Callahan, city engr.

S. D., Spearfish — AIRPORT — City, M. F. Driscoll, aud., plans constructing improvements at airport, incl. administration building, repair shop, etc. $27,500. W.P.A. project.

Tex., Sherman — SWIMMING POOL — See "Public Buildings."

Utah, St. George — OIL FIELD DEVELOPMENT, etc.—Arrowhead Petroleum Corp., E. J. Pickett, pres., or c/o Goodwin, Griswold & Co., Albany, N. Y., plans developing oil and gas properties. To exceed $50,000.

Wash., Bremerton — AIRPORT — Kitsap Co., Court House, Port Orchard, plans improving airport, constructing two 4,000 ft. runways. $83,679. Bureau of Air Commerce approves plans.

Wash., Everett—AIRPORT—Snohomish Co., Court House, plans developing new airport south of Everett on Pacific Hy., $203,477. W.P.A. funds awaited. C. Hickey, Court House, engr.

Que., LaTugue—POWER DEVELOPMENT—St. Maurice Power Co. plans power development on St. Maurice River. Shaurniga Power Co., 107 Craig St. W., Montreal, engrs.

Que., Montreal—POWER DEVELOPMENT—Ontario Paper Co., A. A. Schnon, pres., plans completing water power development on Outarde River near Rimouski, Que. $250,000.

Que., Windsor—DAM—Canada Paper Co. Ltd., preparing plans and may take bids in February, constructing concrete dam on St. Francis River.

BIDS ASKED

Calif., San Francisco — RAILWAYS — See "Contracts Awarded."

Idaho, Idaho Falls—AIRPORT—See "Contracts Awarded."

Mass., Marlboro—AIRPORT—See "Contracts Awarded."

Mississippi — SIGNAL SYSTEM — See "Contracts Awarded."

Mont., Great Falls—AIRPORT—See "Contracts Awarded."

New York—POWER DISTRIBUTION SYSTEM—See "Contracts Awarded."

N. Y., Flushing—COMFORT STATION, etc.—See "Contracts Awarded."

N. Y., Yonkers—PARKS, etc.—See "Contracts Awarded."

Pa., Pittsburgh — COVERED HOPPERS — Aluminum Co. of America, Gulf Bldg., taking bids twenty-two 70 ton covered hoppers for handling aluminum ore.

CONTRACTS AWARDED

★ **Calif., San Francisco**—RAILWAYS—Western Pacific R. R., Mills Bldg., San Francisco, expending $3,700,000 for rails, roadbed, railway improvements and equipment in 1936, in California, Utah and Nevada, day labor and separate contracts.

Calif., Stockton—SWIMMING POOL—College of the Pacific, Stockton, general contract 35x75 ft., rein.-con. swimming pool, chlorinator, etc., to H. W. Johnson, 1229 West Magnolia St., $4,490***plumbing and heating, to Miller-Hays Co., 742 East Weber St., $2,068***mechanical equipment, to Scott Machy. Co., 960 Folsom St., San Francisco, $2,542***electrical work, to Eddy Electric Co., 309 East Weber St., Stockton, $654. Grand total $9,754. Awarded Jan. 3. Noted Nov. 20 C. D.—Nov. 28, E. N.-R.

Fla., Jacksonville—CABLES—Municipal Electric Plant constructing underground transmission system of cables between Laura St. station and McDuff Ave. sub-station. $170,909. Owner builds. Federal grant of $76,909 is provided, and balance will be provided from Electric Power plant funds. **P.W.A.**

Idaho, Idaho Falls—AIRPORT—City, constructing airport, by force account. $43,406. **W.P.A.** Noted July 12, 1933, C. D.—July 20, 1933, E. N.-R.

Ind., East Chicago—DOCKS, etc.—Standard Oil of Indiana, East Chicago, constructing docks, storage, etc., to Fitzsimons & Connell Dredge & Dock Co., 10 South LaSalle St., Chicago, Ill. Est. exceeds $200,000. Contractor awarded about 500 tons steel sheet piling, to Carnegie Illinois Steel Co., Carnegie Bldg., Pittsburgh, Pa.

Mass., Marlboro — AIRPORT — City, C. A. Lyons, mayor, City Hall, municipal airport, day labor under **W.P.A.** Est. $50,000.

Mississippi—SIGNAL SYSTEM—St. Louis & San Francisco R. R., 902 Olive St., St. Louis, Mo., constructing 49 mi. automatic signal system from New Albany to Amory, separate contracts. $140,000.

Miss., Meridian — LANDING FIELD — City, c/o C. Vinson, mayor, remodeling Key Field into an up-to-date landing field, grading, drainage, gravel base course and asphalt topping for 2 runways, 150x3,000 ft. each, and panels to hangar approximately 100,000 sq.yd. paving, also lighting system, work to be done with P.W.A. labor and material. $123,000. W.P.A. approval of $116,000, city furnishing $7,000 for project. J. T. Watts, city engr.

Mont., Great Falls—AIRPORT—City, constructing airport, day labor. $44,000. **W.P.A.** A. J. Cook, city engr.

Neb., Omaha—TRAFFIC LIGHTS—City, City Hall, furnishing 40 double exposure traffic lights for 10 new intersections, to Sterling Electric Co., 2429 Farnam St., Omaha, $4,980. Bids Dec. 17. Noted Nov. 6, C. D.—Nov. 14, E. N.-R.

★ **New York** — POWER DISTRIBUTION LINES — Niagara, Lockport & Ontario Power Co., Niagara Falls, constructing 375 mi. transmission lines near Medina, to W. C. Gallagher, Medina, $450,000. 1,600 mi. distribution lines by separate contracts. Total est. exceeds $1,000,000. Noted Oct. 7, C. D.—Oct. 10, E. N.-R.

N. Y., Flushing—COMFORT STATION, etc.—Dpt. Parks, Arsenal Bldg., Central Park, New York, constructing comfort station and shelter at Bowne Park, 29th Ave. and 159th St., day labor. $40,000. **W.P.A.** A. Embury, c/o owner, archt. Owner now purchasing materials.

N. Y., Yonkers—PARKS, etc.—Municipality, City Hall, improving parks and playgrounds, incl. grading, topsoiling, 25 acres, constructing driveways, Cross County Parkway and Central Ave., W.P.A. relief labor. $72,000. C. Sheridan, city engr.

Pa., Pittsburgh — TUNNELS, etc. — R. G. Woodside, controller Allegheny Co, constructing drainage and sealing of concrete lining, Liberty Tunnels, 1 mi. long, to W. S. Rae, Kopper Bldg., $29,995***painting Liberty Tunnels, incl. necessary grinding, cleaning and waterproofing for total length of tunnel, approximately 12,000 ft., to Silux Paint Co., Investment Bldg., $87,803***utility tunnel at municipal airport, Mifflin Twp., to J. W. McLaughlin, Bulletin Bldg., Pittsburgh, $16,041***steel doors for auxiliary buildings, to Dick Constr. Co., 2532 Library Rd., $4,900***underground steam mains and returns, to Geo. H. Soffel Co., 107 East Carson St., $49,472. Grand total $188,211. Bids Dec. 24. Noted Dec. 19 and Jan. 7, C. D.

South Carolina—TRANSMISSION LINES—S. C. Rural Electrification Authority, A. J. Beattie, secy., constructing complete electric extensions in various sections of state as designated by authority, nine projects, to R. H. Bouligny, Inc., 433 West Moorehead St., Charlotte, N. C., $12,381***two projects, to F-B Electric Co., Chester, $4,371***two projects, to

Constr. News page 55

---

†*Federal Government.*

Unclassified (Continued)

Harrison Wright & Co., 116 West 3rd St., Charlotte, N. C., $722***four projects. to Southern Electric Service Co., Spartanburg, $4,563. Grand total $22,037. Contractors purchase materials.

MATERIALS AND EQUIPMENT

PROPOSED WORK

CRUSHED ROCK—**Huntington Park, Calif.**—City Council rejected bids Dec. 30, furnishing 2,500 tons Nos. 2 and 3, 1,000 tons No. 4 and 250 tons No. 5 crushed rock.

FIRE PUMPER — **Bristol, Conn.** — City, W. Kenneth Sessions, Comr. Fire Bd., plans purchasing fire pumper for School St. fire station. $8,000.

FIRE PUMPER—**Coventry, Conn.**—Coventry Volunteer Fire Dpt., Tracy Bldg., appropriated $4,000 for purchase of fire pumper, probably Maxim type

†CRANE CONTACT RAIL GUARDS SYSTEM, etc.—**St. Paul, Minn.**—U. S. Eng., 615 Commerce Bldg., withdrew bids to have been opened Jan. 7, furnishing crane contact rail guard and screen systems at Lock and Dam 4, Alma, Wis., and at Lock and Dam 5, Whitman, Minn. Noted Dec. 17, C. D.

†SOFT WOOD — **Kansas City, Mo.** — U. S. Eng., 232 Mfg. Exch. Bldg., rejected bids Jan. 6, soft wood, for Missouri River work. $4,500. Noted Dec. 30, C. D.

CONDUIT—**Cleveland, O.**—City soon takes bids 60,000 ft. fibre conduit. 25,000 ft. lead covered cable, 3 transformers and 12 units of switchgear and housing.

BIDS ASKED

SAND and GRAVEL LOADER—**Bethany, Conn.** — A. Fenwick, Bethany, in market for bucket type sand and gravel loader.

MOTOR TRUCKS—**Hartford, Conn.**—Jan. 28, by Bd. Contr. & Supply, Municipal Bldg., 550 Main St., furnishing nine 2 wheel drive truck units and three front and rear axle, four wheel drive truck units, incl. chassis, cab, body and hoist, to be delivered ready for use.

†CEMENT—**Wash., D. C.**—Jan. 27, at office General Purchasing Officer Panama Canal, portland cement.

GENERATOR—**Chicago, Ill.**—Iron & Steel Products, Inc., Railway Exch. Bldg., in market for 1,000 kilowatt, 60 cycle, 3 phase, Diesel engine generator.

CULVERT PIPE—**Decorah, Ia.**—Feb. 5, by Winneshiek Co., S. Handley, aud., 7,030 lin.ft. 15- to 36-in. corrugated metal or rein.-con. culvert pipe; 75,000 ft. fir lumber; ½ car 16 ft. creosoted piling and ½ car sawed creosoted rough fir lumber. F. W. Arneson, co. engr.

ROAD GRADERS, etc.—**Vinton, Ia.**—Jan. 30, by Benton Co., C. Culver, aud., 2 heavy road graders, 3 push maintainers, 3 tractors, 5 pull maintainers, 3 fresnoes, f.o.b. here. M. A. Hall, co. engr.

†DUMP TRUCKS—**Eastport, Me.**—Jan. 31, by U. S. Eng., Eastport, 4 wheel-drive dump trucks.

†TRUCKS—**Eastport, Me.**—Jan. 30, by U.S. Eng., trucks.

LUMBER—**Beverly, Mass.**—Jan. 28, by City, Comn. P. Service & Aid, City Hall, 80,000 ft. B. M. lumber.

MOTORS—**Chelsea, Mass.**—W. J. Rudolph, 708 Broadway, in market for two 7½ hp., two 20 hp., three 5 hp., two 2 hp. and one 3 hp. 220-volt, 3-phase, 60-cycle, 1,800 r.p.m. motors.

†ELECTRIC MOTOR — **Vicksburg, Miss.** — Feb. 11, by U. S. Eng., Box 667, Vicksburg, one 40 hp. electric motor, f.o.b. Greenville.

†GASOLINE ENGINE—**Vicksburg, Miss.**—Feb. 14, by U. S. Eng., P. O. Box 667, marine gasoline engine, f.o.b. Greenville.

†LUMBER — **Vicksburg, Miss.** — Feb. 3, by U. S. Eng., dense, long leaf or short leaf southern yellow pine.

BRAKE—**Sherman, N. Y.**—Duplex Wrench Corp., in market for 6 or 8-foot power brake capable of braking up 11 gage material.

BLADES and NAILS, etc.—**Raleigh, N. C.**—Jan. 30, by Div. Purchase & Contr., A. S. Brower, dir., 1,000 road machine blades, 650 kegs common wire nails and 25 kegs 9 gage galvanized wire staples.

GAS ENGINES, COMPRESSORS, etc.—**Bradford, Pa.**—Sloan & Zook Co., H. L. Smith, supt., in market for gas and gasoline engines, compressors, power plants and other equipment for proposed $750,000 repressuring system in oil field, Sugarcreek Twp., Venango Co.

CABLE — **Tacoma, Wash.** — Feb. 3, by Bd. Contrs. & Awards, 6,000 ft. 350 MCM, 4001-500 volt, 3 conductor or 18,000 ft. 350 MCM, 4001-5000 volt, single conductor rubber insulated power distribution cable; 6,000 ft. 1/0-4001-5000 volt, 3 conductor or 18,000 ft. of 1/0-4001-5000 volt, single conductor rubber insulated power distribution cable; 2,000 ft. No. 4, 4001-5000 volt, 3 conductor or 6,000 ft. No. 4, 4001-5000 volt, single conductor rubber insulated power distribution cable, 15,000 ft. 250 MCM, single conductor rubber insulated network cable; 1,000 ft. 500 MCM single conductor rubber insulated network cable. C. D. Forsbeck, City Hall, engr.

CRANE — **Montreal, Que.** — LaCooperative Catholigue de Consummateurs de Combustible Ltd., 1403 Alfred Bldg., in market for crane, gasoline engine with clamp 55 ft. boom minimum.

Constr. News page 56

CONTRACTS AWARDED

STEEL PIPE—**Carmichael, Calif.**—R. W. Sullivan, dist. secy., Carmichael Irrigation Dist., Route 5, Box 1427, 3,600 ft. 6 in. 14 gage steel pipe, to Western Pipe & Steel Co., 444 Market St., San Francisco, $1,224. Bids Dec. 30. Noted Jan. 14, C. D.

CAST IRON PIPE, etc.—**Fresno, Calif.**—H. S. Foster, city clk., 875 lin.ft. 4 in. and 1,400 lin.ft. 6 in. c.i. pipe, to U. S. Pipe & Fdry. Co., Monadnock Bldg., San Francisco, $1,432 plus tax; 2,196 lin.ft. 10 in., 30 lin.ft. 8 in. and 284 lin.ft. 6 in. clay sewer pipe, to Thomson Constr. Co., 2150 G St., Fresno, $978. Bids Jan. 9.

†CLAM SHELL BUCKETS — **Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., 4 clam shell buckets, Proposal 331, to M. P. McCaffrey Co., 1430 North Spring St., $1,070. Bids Jan. 7.

COPPER SERVICE CONNECTING TUBING—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing copper service connecting tubing, Spec. X-3, 2,500 ft. ½ in., 60,000 ft. ¾ in., and 25,000 ft. 1 in., to Plumbing & Heating Supply Co., 4820 Santa Fe Ave., Vernon, $10,306. Bids Jan. 2, awarded Jan. 7.

CRUSHED ROCK—**Los Angeles, Calif.**—A. J. Holm, city purch. agt., crushed rock for period of 6 months beginning with date of contract, Spec. 3448, to Harrison-Nichols Co., 9500 West San Fernando Rd., Roscoe, Los Angeles, $102,602. Est. about $80,000. Bids Dec. 31, awarded Jan. 10.

†DRAG LINE—**Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., 1 drag line, 2 cu.yd. capacity Diesel oil engine driven, crawler type, to Smith-Booth-Usher, 2001 Santa Fe Ave., $17,987. Bids Jan. 6, awarded Jan. 10.

LAT BELT CONVEYOR MACHINERY—**Los Angeles, Calif.**—S. A. Joseph, purch. agt., Metropolitan Water Comn., 306 West 3rd St., one lat belt conveyor machinery for 2 conveyors, Spec. E-233, Drawing B-2743, Bid 51157, Colorado River Aqueduct, to Stephens-Adamson Mchy. Co., 2227 East 37th St., Vernon, $3,232. Bids Jan. 9, awarded Jan. 10.

†LUMBER — **Los Angeles, Calif.** — U. S. Eng., 751 South Figueroa St., lumber f.o.b. here, to Owens Park Lumber Co., 2100 East 38th St., $27,198. Bids Dec. 23, awarded Jan. 1.

†POWER CRANES—**Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., 3, 2 or 1 power crane, diesel oil engine driven crawler type, full revolving type, gross load of 5,100 lbs. at 40 ft. radius and 22,000 lbs. at 15 ft. radius, to Osgood Co., Marion, O., $9,125 each, total $27,375. Bids Jan. 7, awarded Jan. 10.

STEEL RIBS — **Los Angeles, Calif.** — S. A. Joseph, purch. agt. Metropolitan Water Dist., 306 West 3rd St., steel ribs, in connection with Colorado River Aqueduct, to Consolidated Steel Corp., 6500 East Slauson Ave., $7,326. Bids Jan. 10, awarded Jan. 13.

STRUCTURAL STEEL I-BEAM RIBS — **Los Angeles, Calif.** — Metropolitan Water Dist., 306 West 3rd St., F. E. Weymouth, engr., structural steel I-beam ribs with appurtenant splice plates, bolts and nuts for support for 10 ft. diameter tunnels, Colorado River Aqueduct, Spec. 139, to Pacific Coast Steel Corp., East Slauson Ave., Vernon, $14,208. Bids Dec. 16, awarded Dec. 20.

†TRACTOR—**Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., 1 tractor, crawler type, full diesel, not less than 50 hp., to Crook Co., 2900 Sante Fe Ave., $10,367. Bids Jan. 3, awarded Jan. 7. Noted Jan. 10, C. D.

PIPE, etc.—**Oakland, Calif.**—Directors East Bay Municipal Utility Dist., 512 16th St., 5,000 lin.ft. 4 in., 5,000 lin.ft. 6 in. and 6,000 lin.ft. 12 in. asbestos cement pipe for distributing system, under Proposal L.S.161, to Johns-Manville Sales Corp., 1605 Jefferson St., $16,002; electric welding steel joints on 33,000 ft. 6 in. steel pipe for distribution system, aggregating 11,000 lin.ft. welding, to W. E. Thomas, 3140 San Pablo Ave., $4,070. Bids Dec. 26, awarded Jan. 6.

STEEL ROLLING DOORS — **San Francisco, Calif.**—State Bd. of Harbor Comrs., Ferry Bldg., furnishing, installing 11 steel rolling doors for connecting wharf and wharf shed at Piers 24 and 26, to Kawneer Mfg. Co., Dwight Way and 8th St., Berkeley, $4,197. Bids Dec. 26, awarded Jan. 3. Noted Dec. 17, C. D.

†TESTING MACHINES—**Denver, Colo.**—Bureau Reclamation, Denver, Colo., furnishing 2 vertical hydraulic self-indicating compression type testing machines for Island Park Dam at Ashton, Idaho, and Casper Alcova Projects, to Baldwin-Southwark Corp., Eddystone, Pa., $3,300. Bids Oct. 28. Noted Nov. 13, C. D.—Oct. 17, E. N.-R.

CRUSHED TRAP ROCK—**Hartford, Conn.**—City, Bd. Contr. & Supply, 10,000 tons various sized broken stone, and 2,000 tons 2 in., 300 tons 1 in., 1,000 tons ¾ in., 5,000 tons ½ in. and 1,500 tons stone dust, to Edward Balf Co., 177 State St., $13,400. Bids Dec. 17, awarded Jan. 11. Noted Dec. 16, C. D.

RAIL—**Chicago, Ill.**—Wabash R. R. Co., E. L. Crugar, ch. engr., Railway Exch. Bldg., St. Louis, Mo., 10,000 tons rail, to Bethlehem Steel Co., Bethlehem, Pa.***to Carnegie Illinois Steel Co., Carnegie Bldg., Pittsburgh, Pa.*** and to Inland Steel Co., 38 South Dearborn St.

ROLLERS, etc.—**Ames, Ia.**—State Hy. Comn., Ames, 3 pneumatic tired or sheeps foot rollers, to Gibbs Cook Tractor & Equipment Co., Des Moines, $2,138***4 bituminous material mixers, to H. M. Brown Co., 212 12th St., Des Moines, $2,256***five I.S.H.C. standard roll rollers to Davenport-Besler Corp., Davenport, $811***2,400 jack bits, to Gierke-Robinson Co., Davenport, $747. Grand Total $59,520. Bids Jan. 6. Noted Dec. 23, C. D.—Dec. 26, E. N.-R.

SEWER PIPE—**Eunice, La.**—City, 76,000 lin.ft. various sized concrete sewer pipe for sewerage system, to Central Culvert Co., Alexandria, $19,236. **W.P.A.** J. M. Fourmy, Hammond, engr.

STEEL RAILS—**Topeka, Kan.**—Atchison, Topeka & Santa Fe R.R., 47,157 tons steel rails to Colorado Fuel & Iron Co., Pueblo, Colo***9,000 tons to Carnegie-Illinois Steel Co., Carnegie Bldg., Pittsburgh, Pa.***2,416 tons to Inland Steel Co., 38 South Dearborn St., Chicago, Ill.***12,419 tons track fastenings to Colorado Fuel & Iron Co., Pueblo***1,496 tons, to Carnegie-Illinois Steel Co., Carnegie Bldg., Pittsburgh, Pa.***1,019 tons, to Columbia Steel Co., 4834 South St. Louis Ave., Chicago, Ill.***1,019 tons, to Inland Steel Co., 38 South Dearborn St., Chicago Ill.

IRON CASTINGS, etc.—**Boston, Mass.**—City Supply Dpt., D. F. Doherty, supt., City Hall Annex, iron castings and bronze fittings to Sewer Div., to Mechanics Iron Fdry. Co., 38 Kemble St., Roxbury, $7,231. Bids Dec. 31, awarded Jan. 10. Noted Jan. 14, C. D.

CAST IRON PIPE, etc.—**Worcester, Mass.**—City, Superintendent of Sewers, East Worcester St., South Worcester, furnishing c.i. pipe and fittings, to Florence Pipe Fdry. & Mchy. Co., 400 Chestnut St., Phila., Pa., $5,287. Bids Jan. 3.

RAIL, etc.—**St. Charles, Mo.**—Wabash R. R. Co., c/o Receivers E. L. Crugar, ch. engr., St. Louis, and Wabash St. Charles Bridge Co., Railway Exch. Bldg., St. Louis, rail and track fastenings and miscellaneous hardware for use in connection with bridge deck and approaches bridge over Missouri River, Items 1, 3, 39 and 42, to Carnegie-Illinois Steel Co., 506 Olive St., St. Louis, $39,466***Items 16, 18 and 17, to Youngstown Sheet & Tube Co., Shell Bldg., St. Louis, $15,642***Items 11, 12, 13, 21, 22, 23, 24 and 43, to Republic Steel Corp., Paul Brown Bldg., St. Louis, $7,429***Items 28, 29, 32, 33, 34, 36, 37 and 38, to Elliott Frog & Switch Wks. of Rampas Ajax Corp., Main and Converse Sts., East St. Louis, Ill., $3,909***Items 6, 7, 25, 30 and 31, to Morden Frog & Crossing Wks., 8 South Michigan Ave., Chicago, Ill., $2,412***Items 26 and 27, to P. and M. Co., Railway Exch. Bldg., Chicago, Ill., $3,540***Items 2 and 4, to Inland Steel Co., 1st Natl. Bank Bldg., Chicago, Ill., $36,290***treated timber and ties, to Texas Creosoting Co., Orange, Tex., $31,181***treated brine blocks, to Midland Creosoting Co., Toledo, O., $3,477. Grand total $143,346. **P.W.A.** Bids Dec. 10. Noted Dec. 9, C. D.

AMMONIUM SULPHATE, etc. — **St. Louis, Mo.**—St. Louis Water Dpt., 400 tons more or less ammonium sulphate, to G. S. Robins & Co., 316 South Commercial St., $26.95 per ton, f.o.b. 34 East Grand Ave., St. Louis, or Hine, Mo.***1,200 tons more or less sulphate of iron, to American Steel & Wire Co., 506 Olive St., $13.78 per ton, f.o.b. 34 East Grand Ave., St. Louis, or $14.85 per ton, f.o.b. Hine, ½ of 1% discount cash 10 days, 30 days net***2,500 tons more or less of sulphate of alumina, to General Chemical Co., 818 Love St., $17.50 per ton, f.o.b. 34 East Grand Ave., St. Louis, and $17.50 per ton plus 7½c. per cwt. freight rate to Hine, Mo.***350,000 lb. more or less liquid chlorine, to Monsanto Chemical Co., 1700 South 2nd St., $2.28 per cwt., f.o.b. 34 East Grand Ave., St. Louis, and $3.45 per cwt., f.o.b. Hine***19,000 tons more or less lime, to Glencoe Lime & Cement Co., 1608 Pine St., St. Louis, $6.80 per ton, f.o.b. East Grand Ave., St. Louis, and $7.52 per ton at Hine, less 25c. per ton for cash 10 days, 30 days net. Bids Dec. 19 and 20. Noted Dec. 17, C. D.

PIPE—**St. Louis, Mo.**—City, V. P. Roach, city supply comr., City Hall, 8,000 ft. 6 in. Class 150, c.i. pipe and one 6 in. x 6 ft. tee, one 6 in. 90 degree curve and two 6 in. plugs, to National Cast Iron Pipe Co., Tarrant City, Ala., 74c. and 5.4c. per lb. respectively. Bids Dec. 31.

DIESEL ENGINE — **Potter, Neb.** — City, 1 Diesel engine and generator for power plant, to Fairbanks, Morse Co., Beloit, Mich., $10,658. Est. $11,750. **P.W.A.** Bids Nov. 8. Noted Nov. 4, C. D.

†PIPE—**Boulder City, Nev.**—Bureau Reclamation, Denver, Colo., pipe and fittings at Boulder Power Plant, Unit A-8, Spec. 750-D, to Standard Sanitary Mfg. Co., 1730 Blake St., Denver, Colo., $7,585. Bids Dec. 9. Noted Nov. 22, C. D.—Nov. 28, E. N.-R.

†PIPE HANGERS, etc.—**Boulder City, Nev.**—Bureau Reclamation, Denver, Colo., furnishing pipe hangers for Boulder Dam Power Plant, to Power Piping Co., 829 Beaver Ave., Pittsburgh, Pa., $3,985; pipe, valves and fittings for installing Boulder City Water System, to Grinnel Co. of Pacific, 520 Mateo St., Los Angeles, Calif., $6,197. Bids Nov. 7 and 8. Noted Nov. 22, C. D.—Oct. 31, E. N.-R.

†SAFETY DOORS—**Boulder City, Nev.**—Bureau Reclamation, Denver, Colo., furnishing 12 safety doors and appurtenances for passageways in penstocks, anchors, adits and plugs in lower tunnels, Boulder Dam, to Pacific Car & Fdry. Co., White Bldg., Seattle, Wash., $1,475. Bids Nov. 19. Noted Nov. 14, C. D.

†Federal Government

Materials, etc. (Continued)

†BUOYS, **St. George, N. Y.**—Superintendent Lighthouses, St. George, 480 buoys of various types, to Toppett & Wood, Phillipsburg, N. J., $27,199. Bids Oct. 29, C. D.

ALUM, LIME, etc. — **Cincinnati, O.** — City, furnishing 500 tons alum, to Isaac Winkler & Bro. Co., Carew Tower, $12,750***1,900 tons quick lime, to Gager Lime Mfg. Co., Cincinnati, $15,352***sugar sulphate of iron, to American Steel & Wire Co., Union Trust Bldg., $25,704***chlorine, to Buckeye Soda Products Co., 32 Main St., $3,723***ammonia, to Wirthlin-Mann Co., 66 Plum St., $4,257***15 tons activated carbon, to Industrial Chemical Sales Co., 514 Main St., $1,530. Grand total $63,316. Noted Nov. 29, C. D.

FIRE HYDRANTS—**Cincinnati, O.**—City, furnishing 15 fire hydrants to Bd. Park Comrs., to Columbia Iron Wks., 2129 Reading St., at $50.35 each, total $755. Awarded Jan. 7. Noted Dec. 27, C. D.

WATER METERS—**Cincinnati, O.**—City, furnishing two thousand five hundred ⅝ in. and fifteen 3 in. disc type water meters, to Worthington-Gamon Meter Co., Chamber of Commerce, $15,300. Awarded Dec. 26.

†WEATHERSTRIPPING, etc.—**Grand Coulee, Wash.** — Bureau Reclamation, furnishing weatherstripping, to Ace Weatherstripping Co., 411 Sprague St., Spokane, $1,539; pipe couplings, to Graybar Electric Co., 1501 18th St., Denver, Colo., $24,327. F. A. Banks, Grand Coule, engr.

PIPE—**Tacoma, Wash.**—City, constructing 2,203 ft. 6- to 18-in. c.i. water pipe, to U. S. Pipe & Fdry. Co., Colman Bldg., Seattle, $5,015. W. Kunigh, City Hall, engr.

VALVES—**Seattle, Wash.**—City, furnishing 113 valves for City Light's new Diablo powerhouse, to Seattle Plumbing Supply, 590 1st South St., $1,244. W. J. McKeen, City Light Bldg., engr.

PIPE, etc.—**Green Bay, Wis.**—City, 1,268 ft. 24 in. rein.-con. pipe, 709 ft. 12 in. concrete pipe, 1,825 cement blocks, etc., steel pipe, to Northern Coal & Supply Co., Green Bay, $3,848. Bids Dec. 16. F. J. Stuno, city engr.

†BUCKET REPAIRS, etc.—**Milwaukee, Wis.**—U. S. Eng., repairing buckets, caisson plant machinery, etc., for 1936, to J. Obenberger Co., 155 South Barclay St., $1,554. Bids Jan. 9, awarded Jan. 11. Noted Jan. 8, C. D.

CEMENT — **New Westminster, B. C.** — Provincial Govt., supplying 105,000 bbl. cement for toll bridge, to B. C. Cement Co. Ltd., Vancouver, $242,340.

FOREIGN

Australia—Melbourne Municipality preparing plans garage and office building, on western market site, $1,500,000***Ministry of Education New South Wales Government, **Newcastle,** preparing plans technical school, $750,000*** Federal and State Railway Ministries, **Adelaide,** plans constructing railroad from Kalgoorlie and Port Pirie, $4,500,000.

Chile, Valparaiso—V. D. Heyde Eggers & Larrain, Salvador Donaso, 1474, in market for aluminum and bronze powder, 25 grms., envelopes and ¼, ½ and 1 kilo jars.

England—Henry Reenell & Co., Ltd., Effingham Rd., **Sheffield,** plans erecting plant*** Edward Freemen Ltd., Melbourne House Aldwych, W.C., plans factory, **London*****W. R. Davidge, archt., preparing plans 2½ mi. viaduct over Colne Valley, extension of Western Rd., for Middlesex County Council, **London,** $1,758,475*****Birmingham** Electricity Commission, preparing plans extending Hams Hall Power Station, $4,500,000***Martin Baker Aircraft Ltd., Higher Denham, in market for several vertical milling machines both plain and universal, also for one 18/24 in. high speed hacksaw, **Uxbridge*******Newcastle-on-Tyne** Municipality plans housing development on 169 acre site recently purchased*****Halifax** Municipality preparing plans 200 houses at Overden, $510,000*****Rotherham** Municipality preparing plans 268 houses at Canklow, $536,000.

England—Southport Municipality plans constructing new police headquarters building, $500,000. E. V. Harris, archt., London, receiving competitive plans***Bernard & Sons, archts., **Bristol,** preparing plans 3 ward block addition at Ham Grean Hospital.

England, London — Bowes Seal Fast Corp., 226 North Pine St., Indianapolis, Ind., plans plant. $37,000 with equipment.

Holland, The Hague—Director of Municipal Works of The Hague, Bierkade 4, The Hague, and Municipality of Rotterdam, plan laying out aerodrome at Delft, incl. hangars, sheds, workshops, station building. 1,320,000 florins. Intending bidders should file names with Colonel H. Walaardt Sacre, Anna Paulownaplein 3, The Hague.

Japan, Tokyo—Southern Manchuria Railway Co., preparing plans constructing coal liquefaction plant at Fushum, 15,000,000 yen (about $4,300,000); also Manchu Aluminum Co., preparing plans for plants for producing aluminum and soda, 12,000,000 yen (about $3,480,000).

Mexico — Mexican Government, Treas. Dpt., Mexico City, soon takes bids constructing dam and irrigating 300,000 hectares in Sonora State. To exceed $1,000,000.

Mexico, Mexico City — Government, Mexico City, soon takes bids constructing dam on Bavispe River, Angostura, Sonora, to irrigate 300,000 hectareas and to generate 20,000 kilowats of electric power; dam at El Palmito on Nazas River, Durango, to fertilize 2,000 hectareas and produce 40,000 kilowats, and dam at El Azucar on San Juan River tributary of Rio Grande, in Tamaulipas, to irrigate 250,000 hectareas. 60,000,000 pesos ($19,000,000).

Mexico, Mexico City—Mar. 31, by Ministry of War & Marine, Engineering Dpt., Calle Escuela Medico Militar 15, Mexico City, constructing central military hospital. 3,500,000 pesos.

Mexico, San Luis Potosi City—National Railway of Mexico, Tampico, Mexico and Mexican Government, Mexico City, soon let contract railway station and depot. To exceed $500,000.

New Zealand, Whakatone—L. A. DeGuerre, engr., Wisconsin Rapids, Wis., U. S. A., plans ground wood sulphate pulp and kraft paper plant, 60 tons daily capacity. H. A. Horrocks, managing director will reach United States early in January to purchase equipment.

Northern Ireland, Belfast—Kennedy & Morrison Ltd., Library St., in market for wrought iron or steel tubes, sizes ½ to 6 in.

PUBLIC BUILDINGS

PROPOSED WORK

Calif., El Segundo—El Segundo School Dist. soon takes bids elementary school. $165,000. S. Lunden, 400 Rowan Bldg., Los Angeles, archt. P. Jefferson, structural engr. and R. Phillips, mechanical and electrical engr., both 816 West 5th St., Los Angeles. Noted Sept. 26, C. D.—Oct. 3, E. N.-R.

Calif., Santa Monica — Santa Monica Bd. Educ. plans being completed by Marsh, Smith & Powell, 508 Architects Bldg., Los Angeles, for new rein.-con. auditorium, new frame, stucco boys' gymnasium and connecting arcades and reconstruction and remodeling existing main building, cafeteria, science and shop wing at the Santa Monica High School. $450,000. W.P.A. will finance 80% of construction and costs. Noted Oct. 15, C. D.—Oct. 17, E. N.-R.

Conn., New Britain — New Britain General Hospital, 92 Grand St., plans by Perry & Bishop, 17 Court St., 3 story, brick, steel, limestone hospital wing, incl. dormitory, laboratory and X-ray department. $140,000.

Conn., Torrington—Town, Bd. Selectmen, Town Hall, plans by Ebbets & Frid, and C. Johnson, 15 Lewis St., Hartford, assoc. archts., brick, stone town hall. $200,000. P.W.A. project. Mylchreest & Reynolds, 238 Palm St., Hartford, engrs.

Ga., Gainesville—Hall Co., c/o R. G. McConnell, chn. Bd. Comrs., election Feb. 5, $140,000 constructing 2 story, basement, rein.-con., brick, steel, stone court house. Daniell & Bentell, Atlanta, archts. Noted Oct. 24, C. D.—Oct. 31, E. N.-R.

Ga., Sandersville—City, Dpt. P. Wks., City Hall, soon lets contract constructing additions and improvements to present power system, incl. repairs and additions to present system and building, new Diesel engine, new pumps, reservoir, etc. City Engineer, engr.

★ **†Ill., Chicago**—Treas. Dpt. at office Sup. Archt., Wash., D. C., bids early in March remodeling U. S. Post Office and Federal Building, Adams, Dearborn, Jackson and Clark Sts. $675,000. L. Simon, Wash., D. C., archt.

Ind., Michigan City—Bd. School Trustees, H. F. Miller, chn., revised plans by Ahlgrin & Boonstra, Michigan City, 1 story, basement, balcony, 180x190 ft., brick, steel auditorium and industrial arts building, $202,000. P.W.A. project. Bids Jan. 3 rejected. N. J. Riebe, engr.

★ **Ill., Springfield**—City, City Hall, plans by C. T. Meyer, Myers Bldg., constructing power plant, at Lake Springfield, 6 mi. southeast of here. $750,000.

†Md., Aberdeen—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans 1 story, basement post office. $65,000.

Md., New Windsor — Bd. Educ. Carroll Co. revised plans by O. E. Adams, 329 North Charles St., Baltimore, new high school. P.W.A. project. Bids Jan. 10 rejected. Noted Jan. 8, C. D.

†Md., Salisbury—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans 1 story, basement U. S. Post Office. $195,000.

†Md., Upper Marlboro—Treas. Dpt. at office Sup. Archt., Wash., D. C., plans new U. S. Post Office. $70,000.

★ **Mass., Belmont**—Town, J. W. Flett, chn. Bd. Selectmen, Town Hall, plans by C. E. Maguire, town archt., Homer School, Moore St., 3 story, basement, brick, steel, stone, granite new town hall, concrete found. $529,000. P.W.A. grant $238,500. Noted Nov. 20, C. D.—Nov. 28, E. N.-R.

Mass., Norwell—Town, L. Wadsworth, chn. Building Com., Town Hall, will not construct high school addition. Project abandoned. Town plans by J. Williams Beal & Sons, 185 Devonshire St., Boston, new high school. To exceed $140,000.

Mass., Quincy — City, Mayor's Office, City Hall, plans by P. A. and C. Coletti, 168 Dartmouth St., Boston, 3 story, basement, 50x120 ft., brick administration unit at city hospital. $150,000. P.W.A. project. Noted July 6, 1934, C. D.—July 12, 1934, E. N.-R.

Mass., Walpole—Town, T. H. Bateson, chn. Building Comn., Town Hall, plans by W. G. Upham, 700 Washington St., Norwood, replacing present Stone School, brick, steel, concrete found. To exceed $150,000. Awaiting Special Town Meeting to decide. Noted May 13, C. D.—May 16, E. N.-R.

Mass., Waltham—Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, Boston, rejected bids Dec. 2, 3 story, basement, 30x146 ft., and two 32x64 ft. wings, children's psychiatric building at Metropolitan State Hospital. $175,000. P.W.A. project. R. D. Kimball Co., 6 Beacon St., Boston, engrs. Desmond & Lord, 1 Beacon St., Boston, archts.

Minn., Moorhead — City, R. G. Price, clk., bids early in February, 1 story, rein.-con. power plant, ash handling equipment, stack, etc. $75,000. R. D. Thomas, 1200 2nd Ave. S., Minneapolis, engr. Noted Dec. 9, C. D.

Minn., Rochester — City, Library Bd., W. H. Churchill, pres., election Mar. 25, for $75,000 bonds for constructing 1 story, basement, library. $150,000. H. H. Crawford & P. Bross, Rochester, archts. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

Mo., Marshall — City plans improving municipal power plant and distribution system. $158,545 loan and grant allotted by P.W.A. Henri Lowry Eng. Co., 144 West 10th St., Kansas City, engrs. Noted Oct. 15, C. D.—Oct. 17, E. N.-R.

Mont., Helena—Bd. Educ., plans by Hugenin & DeKay, 1021 Prophyry St., repairing high school and rebuilding Bryant School. $175,000. Noted Nov. 6, C. D.—Nov. 14, E. N.-R.

†Neb., Omaha — Regional Resettlement Administration, Wash., D. C., plans by C. A. Ward, State RRA dir., Lincoln, constructing 56 houses for rural resettlement development at Aksarben Village, near here. Est. about $280,000.

†N. H., Plymouth—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids Jan. 3, constructing U. S. Post Office. Will readvertise. Noted Jan. 9, C. D.—Dec. 26, E. N.-R.

N. J., Belvidere — Bd. Educ. constructing school, owner deferred taking bids until April or later. $210,000. Coffin & Coffin, 125 East 46th St., New York, archts. Noted Sept. 26, C. D.—Oct. 3, E. N.-R.

N. M., Sante Fe—State, Sante Fe, rejected bids Dec. 9, constructing 3 story, basement, 200x200 ft. supreme court building. Don Gaspar Co. Will readvertise. Noted Dec. 16, C. D.

N. Y., Albany—Albany Regional Market Authority, City Hall, bids early in spring constructing regional market. To exceed $105,000. J. J. McManus, city engr.

†N. Y., Champlain—U. S. Custodian, Custom House, Boston, Mass., soon takes new bids constructing driveway and approaches for inspection station at Canadian border, Clinton Co. Former bids rejected.

N. Y., Eaton—Central School Dist. 1, Waterville, plans by C. W. Clark, 27 North Main St., Cortland, and takes bids probably in March, constructing brick, steel school, plain found. $185,625. P.W.A. project.

N. Y., Oneida—City, City Hall, rejected bids Dec. 23, constructing hospital. $308,437. Will readvertise. E. D. Pitt, Kenwood, archt. Noted Jan. 2, C. D.—Dec. 19, E. N.-R

N. Y., Warsaw—Bd. Supervs. Wyoming Co., election Feb. 8, constructing hospital addition. To exceed $105,000.

†N. Y., Waverly—Treas. Dpt. at office Sup. Archt., Wash., D. C., purchased site and plans constructing U. S. Post Office, east side of Waverly St., opposite Elizabeth St.

★ **†O., Dayton**—Veterans Facility plans constructing 3 new barracks, dining hall, kitchen, altering hospital, repairing and improving Veterans Facility, West 3rd St. $1,350,000.

†Okla., Fort Sill—Con. Q. M., plans hospital. $360,000 appropriated.

†Ore., Portland—U. S. Forest Service plans constructing hotel, incl. trail building, parking areas, swimming pool, toboggan and ski runs, ski jumps, tennis courts, barns, etc., at Timberline, on Mount Hood. $275,500. W.P.A. project.

★ **Ore., Salem**—State Commission for Capitol Building, has instructed the sub-committee to address at least 6 prominent architects asking for terms and suggestion for (if selected), as acting advisor to committee on formulating general plans and rules for selecting architect for plans and supervising erection of new capitol building. $2,500,000. Noted Sept. 30, C. D.—Oct. 3, E. N.-R.

R. I., Burrillville—State, Emergency P. Wks. Comn., State House, Providence, rejected bids Dec. 18, for children's infirmary at Wallum Lake Sanatorium. P.W.A. project. Will probably refigure. Noted Jan. 2, C. D., under "Low Bidders."

R. I., Howard (Cranston)—State Emergency P. Wks. Comn., State House, Providence, rejected bids Dec. 16 for cottages for physicians at mental hospital; rejected bids Dec. 13, laboratory building at state hospital; rejected bids Dec. 6, employees dormitory at state infirmary; rejected bids Dec. 12, hospital building at state hospital. Will probably readvertise. Noted Dec. 16, C. D.—Oct. 17, E. N.-R.

†Tex., Port Arthur—Treas. Dpt. at office Sup. Archt., Wash., D. C., rejected bids Dec. 27, constructing U. S. Post Office. Will readvertise.

Constr. News page 57

---

†*Federal Government.*

Public Buildings (Continued)

Noted Jan. 10, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

Tex., Sherman — City, H. G. Tuck, mayor, voted $125,000 bonds for high school auditorium, large auditorium for Kidd Key College, overhead water reservoir, and watermain extensions, concrete swimming pool. Federal aid of $121,250. Total $246,250.

★ **Wash., Bellingham** — Bd. Educ. following destruction by fire Jan. 1 of Fairhaven High School board asks P.W.A. to reconsider grant previously refused $500,000 bond issue voted last fall contingent upon getting P.W.A. grant.

Wash., Yakima — School Bd. rejected bids Jan. 10, high school. J. W. Maloney, archt., Larson Bldg., ordered to revise plans for resubmission to P.W.A. Noted Jan. 7, C. D.

B. C., Vernon—City plans constructing new brick, wood elementary school, 7th St. at Pine St. $150,000. By-law will be voted on Jan. 16. Architect not appointed.

Ont., St. Catherines—City plans by R. Macbeth, 104 Queen St., new city hall and police station. $150,000. Noted Dec. 18, C. D.

★ **Ont., Sudbury** — Ontario Hydro-Electric Power Comn., 190 University Ave., Toronto, T. S. Lyon, chn., soon takes bids installing new 5,000 hp. unit at Ear Falls to serve Red Lake Mining Dist., and 1,000 hp. unit at Rat Rapids to supply Pickle Crow and Central Patricia gold mines in Pickle Lake area, also extending transmission line from Howey Mine to Pipestone Bay. $750,000.

★ **Ont., Toronto**—Dpt. Agriculture Marketing Bd., Ottawa, W. B. Somerset, dir., soon takes bids constructing new terminal warehouse for fruit and vegetables. $1,000,000. Architect not appointed.

BIDS ASKED

†Ariz., Sasabe—Feb. 14, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing inspection station. $17,500.

Calif., Long Beach — Jan. 31, by Bd. Educ., 715 Locust Ave., administration building at Lindberg Junior High School. Market St., at Lewis Ave. $150,000. Gentry & Haynes, Jergins Trust Bldg., engrs.

Calif., Norwalk—Feb. 4, by State Dpt. P. Wks., Div. of Architecture, Sacramento, 2 story, rein.-con. ward building. $100,000 or more. G. B. McDougall, State Architect, P. Wks. Bldg., Sacramento, archt. Noted Sept. 11, C. D.—Sept. 19, E. N.-R.

★ **Calif., Sacramento**—Feb. 11, by State Div. of Architecture, P. Wks. Bldg., **(a)** general contract **(b)** electrical work **(c)** plumbing **(d)** heating and ventilating **(e)** elevators 4 story, rein.-con. office building, N St. between 11th and 12th Sts. $600,000. G. B. McDougall, P. Wks. Bldg., archt. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

★ **†Calif., Santa Barbara**—Feb. 4 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing 2 story, basement, 170x170 ft. U. S. Post Office. $445,000. Noted Dec. 18, C. D.—Dec. 26, E. N.-R.

Conn., Ansonia—Bd. Educ. bids about Feb. 1, general contract high school. Howe & Lescaze, 211 East 48th St., New York, archts. Noted Dec. 5, C. D.

Ga., La Grange—See "Contracts Awarded."

†Ill., Quincy—Feb. 11 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Dec. 23, C. D.—Dec. 26, E. N.-R.

Ind., Indianapolis—See "Contracts Awarded."

†Mass., Gardner—Feb. 10, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $128,000. Noted Aug. 19, C. D.—Aug. 1, E. N.-R.

Mass., Quincy—Jan. 28, by City, E. C. Sargent, comr. P. Wks., 13 Temple St., 2 story, basement, brick, steel, granite administration building, concrete found., at city hospital, also demolition of present building. To exceed $150,000. P. A. and C. Coletti, 168 Dartmouth St., Boston, archts. Noted Jan. 13, C. D.—Jan. 16, E. N.-R.

Minn., Buffalo—Jan. 28, by Bd. Educ., W. D. Oakley, clk., superstructure for 2 story, basement, school and auditorium. P.W.A. project. Pass & Pickey, Mankato, archts. Noted Dec. 2, C. D.—Dec. 5, E. N.-R.

Miss., Jackson—Jan. 31 (extended date), by School Dist., constructing new Junior High School. $280,000. P.W.A. project. N. W. Overstreet & Town, Jackson, archts.

★ **Mo., Excelsior Springs**—Feb. 15, by City, A. Wein, mayor, 5 story, basement, mineral water building for dispensing different spring waters for baths and drinking. $800,000. Black & Veatch, 4706 Bway., Kansas City, consult. engrs. Noted Jan. 5, 1934, C. D.—Jan. 11, 1934, E. N.-R.

★ **Mo., Kansas City**—Jan. 30, by City, H. E. McElroy, mgr., constructing 32 story, basement, 130x180 ft., frame city hall, 12th and Oak Sts. $2,000,000. P.W.A. project. Wight & Wight, 1st Natl. Bank Bldg., Kansas City, archts. Noted Dec. 11, C. D.—Dec. 19, E. N.-R.

†N. J., Atlantic City—Feb. 6, by Treas. Dpt. at office Sup. Archt., Wash., D. C., freight elevator in U. S. Post Office.

Constr. News page 58

N. Y., Brooklyn—Feb. 4, by Bd. Higher Education, 383 Pearl St., New York, electrical work and certain lighting fixtures, for academic building and science building, incl. greenhouse, lighting fixtures for library buildings, for Brooklyn College. R. Evans, archt. Corbett, Harrison & MacMurray, 140 Nassau St., New York, assoc. archts.

N. Y., New York—Jan. 31, by W. C. Martin, archt. and supt. School Buildings, Flatbush Ave. Extension and Concord St., Brooklyn, plumbing, drainage, heating, ventilating, electrical work for P. S. 107, Seward Ave. between Fetley and Croes Aves., for Bd. Educ., 500 Park Ave. Noted Oct. 25, C. D.—Oct. 31, E. N.-R., under "Contracts Awarded."

N. Y., New York—Feb. 5, by Dpt. Health, 125 Worth St., general contract plumbing, heating, ventilating, fixtures, electrical work, Central Harlem Health Center, 137th St. and 5th Ave. Noted Nov. 14, C. D.—Nov. 21, E. N.-R.

N. Y., Rochester — Jan. 28, by City, Div. Purchase, City Hall, constructing Rundel Memorial Library addition, Broad St. To exceed $100,000. Gordon & Kaelber, 311 Alexander St., archts. Noted Nov. 27, C. D.—Dec. 5, E. N.-R.

†N. Y., Rochester—Feb. 3, by Treas. Dpt. at office Sup. Archt., Wash., D. C., 1 freight elevator in U. S. Post Office.

N. Y., Rochester—Feb. 5, by City, City Hall, general contract plumbing, heating, electrical work for 2 story, basement, 70x229 ft., brick, steel central fire headquarters, plain found., University St. $406,600. J. P. Flynn, 154 East Ave., archt.

†N. Y., Rome—Feb. 12 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, East Park. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

N. Y., Wallkill—Feb. 27, by Dpt. Correction, State Office Bldg., Albany, constructing farm buildings, incl. 2 silos, sewage disposal plant, sheds, etc., at Wallkill Prison. W. E. Haugaard, state archt., and T. F. Farrell, state engr., both State Office Bldg., Albany.

N. Y., West New Brighton—Jan. 28, by W. V. Martin, archt. and supt. School Buildings, Flatbush Ave. extension and Concord St., Brooklyn, constructing Curtis High School additions, Hamilton Ave. and St. Marks Pl. for Bd. Educ., 500 Park Ave., New York.

N. Y., Wingdale—Jan. 29, by Dpt. Mental Hygiene, State Office Bldg., Albany, constructing assembly hall, at Harlem Valley State Hospital. $275,000. W. E. Haugaard, state archt., and T. F. Farrell, state engr., both State Bldg., Albany. Noted Oct. 30, C. D.—Nov. 7, E. N.-R.

†O., Sidney—Jan. 30, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office.

Tenn., Nashville—Jan. 28, at office H. Howse, mayor, constructing superstructure and balance of excavation and foundation work for West End Senior High School, near Elmington Park. $336,216. D. W. Southgate, 1019 Nashville Trust Bldg., archt.

†Tex., Dallas — Jan. 31, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Parcel Post Building, (except elevators). Noted Mar. 4, 1935, C. D.—Mar. 7, E. N.-R.

Tex., Livingston—Jan. 30, by Bd. in office Tax Assessor and Collector, J. E. Hill, pres., 1st. Natl. Bank Bldg., 2 story, brick, rein.-con. steel high school and auditorium, plain found., for Livingston Freek School Corp., J. M. Hooks, pres. $140,000. P.W.A. project.

†Va., Norfolk—Feb. 3, by Treas. Dpt. at office Sup. Archt., Wash., D. C., interior changes in U. S. Post Office and Court House. $25,000. Bids Dec. 16 rejected. Noted Dec. 23, C. D.—Nov. 28, E. N.-R.

LOW BIDDERS

★ **†Fla., Pensacola** — Yards & Docks, Navy Dpt., Wash., D. C., Jan. 15, from Virginia Eng. Co., Newport News, Va., storehouse, shop, hangars, etc., Spec. 8082, for Naval Air Station. $1,277,000; constructing quarters, Spec. 8083 (1) $967,000 (2) $977,000; paving, Spec. 8084, $439,852. Noted Jan. 3 and 9, C. D.—Jan. 9, E. N.-R.

★ **Md., Baltimore** — City, City Hall, Bd. Awards, new Eastern High School, 3 story, basement, Venable Park, from M. A. Long Co., 10 West Chase St., $1,342,000. P.W.A. project. Noted Jan 2, C. D.

CONTRACTS AWARDED

†Ariz., Naco — Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to E. and E. J. Pfotzer, 5305 Haverford Ave., Phila., Pa., $57,880. Bids Dec. 30. Noted Jan. 9, C. D.—Dec. 26, E. N.-R.

†Ariz., Yuma—Bureau Reclamation, furnishing air cooling, heating and distributing equipment for office building and dormitory, at Government Camp, at Imperial Dam and Resilting Works, on All American Canal, to Jardine & Knight Plumbing & Heating Co., Colorado Springs, Colo., $8,877. Bids Nov. 22. Noted Nov. 18, C. D.

Calif., Berkeley—K. E. Parker Co., general contractors, 135 South Park St., San Francisco, awarded sub-contracts in connection with school additions for Berkeley City School Dist. (Garfield School), demolition of buildings on site, to Emsco Concrete Cutting Co., 260 Clementine St., San Francisco; structural steel, to Herrick Iron Wks., 18th and Campbell Sts., Oakland. Noted Dec. 23, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

†Calif., San Diego — Yards & Docks, Navy Dpt., Wash., D. C., paint storage and paint spray booth, Spec. 8115, to Hunt & Curry Co., 507 Bancroft Bldg., $5,016. Spec. 8115.

Colo., Ridge — State Home and Training School, constructing hospital building, dormitory building and 2 residences and altering present building, to W. G. Petry, Denham Bldg., Denver, $125,678. **P.W.A.** Noted Jan. 8, C. D.—Jan. 16, E. N.-R.

Colo., Wheatridge — School Bd. Wheatridge School Dist. 8, c/o L. W. Martensen, secy., general contract new high school, to H. W. Hammond, 4033 West 29th Ave., Denver, $109,450 ***heating, to Johnson & Davis Plumbing & Heating Co., 2235 Arapahoe St., Denver, $18,597***plumbing, to Midwest Plumbing Co., 2450 Blake St., Denver, $5,092***electrical work, to Collier Electric & Radio Co., 52 Broadway, Denver, $3,500. Grand total $136,629. **P.W.A.** Bids Dec. 7. J. K. Monroe, 2nd St. and Bway., Denver, archt.

Conn., Ansonia — City, foundations for high school, to Smith Constr. Co., Derby. (**Correction**—Contractor). Noted Dec. 13, C. D.—Dec. 19, E. N.-R., under "Contracts Awarded."

Conn., Bristol — City, E. A. Reich, supt. schools, Britol. Loucks & Clarke, general contractors, 6 Ernest St., Wallingford, awarded contract for structural steel for elementary school, North St., to New England Iron Wks., Inc., 1351 Dixwell Ave., Hamden, for City, E. A. Reiche, supt. Schools. Noted Dec. 27, C. D.—Jan. 2, E. N.-R., under "Contracts Awarded."

Conn., Stratford—Edward E. Bray Co., general contractors, 362 River St., Bridgeport, excavating town hall to Hy-Way Constr. Co., 362 River St., Bridgeport, for Town, W. H. Shea, mgr.*** sheet metal, to John Schwing Corp., Wood Ave., Bridgeport***terra cotta and hollow tile, to Bowen Fireproofing Co., 101 Park Ave., New York***incinerator, to Sargent Building Specialty Co., 16 Warren St., New York***roofing, to James Wilson Co., 185 Church St., New Haven. Noted Jan. 9, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

Conn., West Haven (br. New Haven)—Town, Bd. Educ., J. J. Daley, general contractor, 165 West Main St., furnishing, erecting steel, for Colonial Park School addition, to Connecticut Steel Erecting Co., 1043 State St., New Haven, for Town, Bd. Educ. **P.W.A.** Noted Dec. 26, C. D.—Jan. 2, E. N.-R., under "Contracts Awarded."

†Fla., Tampa — Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Quarantine Station, to Paul Smith Constr. Co., Haines City, $220,965. Bids Dec. 30. Noted Jan. 7, C. D.—Dec. 5, E. N.-R.

†D. C., Wash.—McCloskey & Co., general contractor, 1620 West Thompson St., Phila., Pa., 2,150 tons structural steel for Archives Building, for Treas. Dpt. at office Sup. Archt., Wash., D. C., to Fort Pitt Bridge Wks., Oliver Bldg., Pittsburgh, Pa. Noted Dec. 17, C. D.—Dec. 26, E. N.-R.

Ga., La Grange — City, c/o R. S. O'Neal, mayor, constructing 2 and 3 story, basement, rein.-con., brick, steel, stone hospital, day labor. $200,000. **W.P.A.** Noted Sept. 18, C. D.—Sept. 26, E. N.-R.

Ind., Evansville—Bd. Educ., general contract 2 story, basement, 235x314 ft. school, Outer Washington Ave., to Tri-State Contg. Corp., 1525 Shanklin Ave., Evansville, $334,331*** steam heating and plumbing, to Tri-State Plumbing & Heating Co., 1114 Main St., Evansville, $64,541***electrical wiring, to Evansville Service Co., Evansville, $16,985. Grand total $415,857. **P.W.A.** Bids Dec. 14. Noted Dec. 19, C. D.

Ind., Indianapolis — Indiana National Guard, E. Straub, adj. general, State House, 2 story, basement, brick naval armory, White River near 30th St., W.P.A. forces. $350,000. O. A. Tislow, 819 Architects & Builders Bldg., archt.

†Me., Eastport—U. S. Eng., Eastport, steel theater building, to Stefco Steel Co., Michigan City, Ind., $7,586***34x100 ft. steel warehouse, to Truscon Steel Co., Youngstown, O., $3,507 ***electric switchboard and equipment, to Westinghouse Electric & Mfg. Co., 10 High St., Boston, Mass., $2,735. Grand total $13,838. Bids Dec. 20. Noted Dec. 17, C. D.

Md., Baltimore—Bd. Awards, 2 story, basement addition to Howard Park School, Liberty Heights Ave., Howard Park, to Lauhi Constr. Co., 337 St. Paul St., $106,782. Est. $100,000. **P.W.A.** Bids Dec. 26, awarded Feb. 2. Noted Dec. 23, C. D.

Mass., Boston—R. J. Connolly, Inc., general contractors, 1146 Dorchester Ave., Dorchester, steel erection public welfare building, 170 Hancock St., Dorchester, to O. H. Horovitz, 31 Montrose St., Newton, for City, Overseers of P. Welfare, 43 Hawkins St.***plumbing, to H. J. Lyons, 39 Melrose St.***electrical work, to Quinn Bros., 239 A St., South Boston*** granite, to Austin Ford & Son, Inc., 73 Main St., Cambridge***reinforcing steel, to Truscon Steel Co., 38 Chauncy St.***structural steel, to West End Iron Wks., 263 Columbia St., Cambridge***iron to Security Fence Co., 22 Kent St., Somerville***stone, to Durastone Co., Box 61, Saylesville, R. I.***marble, to Albee Marble & Tile Co., Inc., 64 Mt. Vernon St., Springfield ***painting, to J. T. Bogue, 21 Crockett Ave., Dorchester. **P.W.A.** Noted Jan. 8, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

Mass., Boston—P. J. Cantwell & Son, general contractors, 644 East 4th St., South Boston, caissons for public welfare building, Maverick

†*Federal Government.*

Public **Buildings** (Continued)

and Bremen Sts., East Boston, to General Foundation Co., 108 Mass. Ave., Boston, for City, Overseers of the Public Welfare, 43 Hawkins St.***reinforcing steel, to Truscon Steel Co., 38 Chauncy St.***setting reinforcing steel, to E. C. Magown, 320 Park Ave., Arlington***granite, to Austin Ford & Son, Inc., 73 Main St., Cambridge***cast stone, to Durastone Co., Box 61, Saylesville, R. I.***structural steel, to West End Iron Wks., 263 Columbia St., Cambridge***marble, to Albee Marble & Tile Co., Inc., 64 Mt. Vernon St., Dorchester***erecting structural steel, to E. C. Magown, 320 Park Ave., Arlington***painting, to J. T. Bogue, 21 Crockett Ave., Dorchester***heating, to J. W. Praught & Co., 1049 Dorchester Ave., Dorchester***plumbing, to Wm. N. McKenna Co., 79 Chestnut St.***electrical work, to Quinn Bros., 239 A St., South Boston. **P.W.A.** Noted Jan. 8, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

Mass., Boston—Rugo Constr. Co., Inc., general contractors, 80 Boylston St., Boston, structural steel for high school, Thomas Park and G St., South Boston, to A. O. Wilson Structural Co., 40 Smith Place, Cambridge, for City of Boston, Dpt. School Buildings, 11 Beacon St.***painting, to Albert D. Howlett Co., 110 Worcester St., Boston***plumbing, to M. Ahern, 711 Boylston St.***heating and ventilating, to Power Heating & Ventilating Co., Inc., 263 Harrison Ave.***electrical work, to Quinn Bros., 239 A St., South Boston***limestone, to J. F. Carew, Inc., 11 Gerard St., Roxbury***reinforcing steel, to Concrete Steel Co., 294 Wash. St., Boston. **P.W.A.** Noted Dec. 30, C. D.—Jan. 2, E. N.-R., under "Contracts Awarded."

†Mass., Eastham—F. A. Days & Sons, general contractors, 24 Pearl St., Providence, R. I., building finish for station dwelling, at Manset Point Coast Guard Station, for Coast Guard Headquarters, Wash., D. C., to Freeman Carder Corp., 48 Border St., West Newton***reinforcing steel, to J. E. Cox, Co., Inc., 753 Davol St., Fall River***structural steel and iron, to Brayton-Wilson Cole Corp., Inc., 130 Magazine St., Roxbury. Noted Dec. 19, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

Mass., Fitchburg—Turner Constr. Co., general contractors, 143 Newbury St., Boston, excavation for high school construction, to C. I. Wright, 8 Scott St., Springfield. Noted Jan. 13, C. D. — Jan. 16, E. N.-R., under "Contracts Awarded."

Mass., Foxboro — Commonwealth of Massachusetts, Dpt. Mental Diseases, State House, Boston, furnishing, installing automatic dry pipe sprinkler system at State Hospital, to Viking Automatic Sprinkler Co., 430 Statler Bldg., Boston, $7,686. **P.W.A.** Bids Dec. 27, awarded Jan. 7. Noted Nov. 14, C. D.—Nov. 21, E. N.-R.

Mass., Haverhill—Walsh Bros., general contractors, 150 Hampshire St., Cambridge, granite for Hale Hospital addition, to John Harrington Co., 52 First St., Cambridge, for City, J. M. Costello, Public Property Comr., City Hall***reinforcing steel, to Kalman Steel Co., 75 Federal St., Boston***structural steel iron, to Lehigh Steel Co., 77 Franklin St., Boston***steel erection, to O. H. Horovitz, 31 Montrose St., Newton***heating, to H. E. Whitten Co., 9 Federal St., Boston***plumbing, to Wm. H. Mitchell & Son Co., 90 Arch St., Boston***electrical work, to Hixon Electric Co., 22 Elkins St., South Boston***excavating, to Jeremiah Sullivan Sons, 25 Willard St., Cambridge. Noted Dec. 20, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

Mass., Ipswich — White Constr. Co., general contractors, 1601 Blue Hill Ave., Mattapa, heating for high school, to P. A. Doln Co., 237 Broadway, Boston, for Town, Dr. E. J. Smith, chn. Building Com., Town Hall***plumbing, to H. F. Nation, 479 Cambridge St., Bridgton***electrical work, to National Electric Constr. Co., 46 Cornhill, Boston***excavation, to Jas. E. Gray, Inc., 6 Ash Pl., Cambridge***steel erection, to O. H. H. Horovitz, 31 Montrose St., Newton***painting, to E. P. Elstrom, 14 Morton St., Malden***roofing, to Burgess & Blacher Co., 18 Eustis St., Roxbury***reinforcing steel, to Morrison, Stevens Co., 6 Beacon St., Boston***structural steel, to West End Iron Wks., 263 Columbia St., Cambridge***iron, to E. Van Noorden Co., 100 Magazine St., Roxbury***stone, to Emerson & Norris Co., 163 North Beacon St., Brigton***tile, to Galassi Mosaic & Tile Co., 11 Bennet St., Boston***building finish, to J. D. MacPhee & Co., 150 Thorndike St., Arlington***waterproofing, to Chester Newman Co., 139 Main St., Cambridge. Noted Dec. 11, C. D.—Dec. 19, E. N.-R., under "Contracts Awarded."

Mass., Lawrence—L. C. Cyr, general contractractor, 45 Melrose St., heating and plumbing for administration building and nurses home on Marston St., to John J. Gaffney & Co., 285 A Haverhill St., for City***electrical work, to Atlas Electric Co., 67 Carver St.***roofing, to Lawrence Roofing Co., 3 Broadway, Methuen***structural steel and iron, to Lowell Iron & Steel Co., Tanner St., Lowell***reinforcing steel, to Truscon Steel Co., 38 Chauncy St., Boston. Noted Dec. 23, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

Mass., Spencer — Town, Supt. of Schools, Spencer, 2 story, 90x140 ft., brick, steel high school addition to Prouty School, to J. W. Bishop Co., 100 Foster St., $167,000. **P.W.A.** Bids Dec. 9, awarded Jan. 7.

Mass., Swampscott—M. Spinelli & Sons, general contractors, 38 Chauncy St., Boston, steel sash for high school additions, to Detroit Steel Products Co., 38 Chauncy St., Boston, for Town, School Building Comn.; waterproofing, to Travers Sandell, Inc., 238 Main St., Cambridge. **P.W.A.** Noted Jan. 14, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

Mass., West Boylston — Fiske Carter Constr. Co., general contractors, 8 Norwich St., Worcester, heating and plumbing for high school, to Tucker & Rice, Inc., 11 Garden St., Worcester, for Town, Building Comn.***electrical work, to Alfred C. Senecal Co., Box 35, Westboro***structural steel and iron, to Eastern Bridge & Structural Co., 88 Crescent St., Worcester***reinforcing steel, to G. F. Blake, Inc., 198 Mechanic St., Worcester***building finish, to Hatch & Barnes Co., 196 Union St., Worcester. Noted Dec. 13, C. D.—Dec. 19, E. N.-R., under "Contracts Awarded."

Mich., Hillsdale—Bd. Educ., Hillsdale, 2 story, basement, brick, steel, concrete school, plain found., to L. Faulke, Hillsdale, $89,800***plumbing and heating, to Eames & Brown, Hillsdale, $18,400***electrical work, to East Lansing Electric Co., East Lansing, $5,462. Grand total $113,662. **P.W.A.** Bids Dec. 9. Noted Jan. 2, C. D.

★ **Mich., Kalamazoo**—Kalamazoo Co., general contract county building and jail, to O. F. Miller Co., Kalamazoo, $452,000***heating and ventilating, to C. L. Mahoney, Kalamazoo, $34,888***elevator, to Westinghouse Electric Elevator Co., 5757 Trumbull St., Detroit, $22,917***jail equipment, to Southern Prison Co., 4700 South Presa St., San Antonio, Tex., $35,526***electrical contract, to Hall Electric Co., Muskegon, $19,185***plumbing, to Wheeler-Blaney Co., Kalamazoo, $25,248. Grand total $589,764. Bids Dec. 10. Noted Jan. 2, C. D.

Miss., Jackson—Bd. Educ., c/o H. T. Newell, pres. Central High School, to Thomas B. Scott, Jackson, constructing cafeteria addition, alterations and auditorium at Duling School, $22,469; repairing Powell School incl. plumbing, electrical wiring, $2,694; excavation and foundation for Junior High School and for additions and alterations to George School, Whitfield School, Barr School and for shop building at Lanier High School, $8,885***to C. C. Scott, Jackson, construction of plumbing and alterations at Jim Hill School, $3,359***to W. J. McGee & Son, Jackson, alterations and additions to Enochs High School Building, $74,154***to W. T. Beckelheimer, Jackson, new negro elementary school, $41,980***to I. C. Garber & Sons, Jackson, general contract gymnasium addition and miscellaneous alterations to Central High School, $55,756***to Paine Heating & Tile Co., Jackson, heating and plumbing for same, $4,167***to Century Electric Co., Jackson, electric wiring for same, $1,050. Grand total $214,514. **P.W.A.** Bids Dec. 6 and 7. Rejected bids Dec. 6, constructing new Poindexter School and additions to Robert E. Lee School. Noted Nov. 22, C. D.—Nov. 28, E. N.-R.

Miss., Meridian—Bd. Trustees, Meridian Separate School Dist., constructing 268x308 ft., brick high school and 130x160 ft. gymnasium, to J. L. McLemore, Meridian, $247,823. **P.W.A.** Mechanical work to be let later. Noted Dec. 16, C. D.—Dec. 19, E. N.-R.

†Miss., Vicksburg—Treas. Dpt. at office Sup. Archt., Wash., D. C., furnishing, installing elevator plant in U. S. Post Office, to Montgomery Elevator Co., 30 20th St., Moline, Ill., $28,359. Bids Jan. 3. Noted Dec. 17, C. D.—Dec. 26, E. N.-R.

Mont., Helena — School Dist., reconstructing high school, to West Coast Constr. Co., Lloyd Bldg., Seattle, Wash.***plumbing and heating, to Northern Plumbing & Supply Co., Helena***electrical work, to Palmquist Electric Co., Helena, on cost plus 10% basis. Est. $175,000. **P.W.A.** Noted Jan. 10, C. D.—Jan. 16, E. N.-R.

Neb., Alliance — City excavating for auditorium, to Nation & Decker, Alliance, $1,173. **P.W.A.** Bids Nov. 30. Noted Dec. 18, C. D.

Neb., Fremont—City, excavation for auditorium, to G. E. Unkel, Fremont, $950. **P.W.A.** Total est. $180,000. Bids Dec. 7. Noted Sept. 25, C. D.—Oct. 3, E. N.-R.

Nev., Carson City—State, general contract 2 story, basement, mezzanine floor, court building, to J. C. Dillard, Reno, $158,700. **P.W.A.** Bids Jan. 3, awarded Jan. 8. Noted Jan. 10, C. D.—Dec. 26, E. N.-R.

N. H., Penacook—H. P. Cummings Constr. Co., general contractors, 14 Prospect St., Ware, Mass., awarded sub-contracts for excavation in connection with construction of high school, to W. J. Lynch, Concord***mill work, to L. W. Webster Corp., Randolph, Vt.***structural steel and iron, to F. P. Lyons Iron Wks., Inc., 500 Willow St., Manchester***stone, to Emerson & Norris Co., 163 North Beacon St., Brighton, Mass.***roofing, to L. H. Ufford, Inc., 25 Pine St., Bellows Falls, Vt.***painting, to H. Newton Marshall Co., 522 Harrison Ave., Boston, Mass. **P.W.A.** Noted Jan. 6, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

N. J., Allentown—Bd. Educ., Upper Freehold Twp., Monmouth Co., plumbing for high school, to G. Feltman, 35 Hamilton Ave., $8,700. **P.W.A.** Noted Dec. 16, C. D.—Dec. 19, E. N.-R., under "Contracts Awarded."

N. J., Bridgeton — Freeholders Cumberland Co., general contract 2 wing additions to hospital building and attendants' home, to C. L. Furner, Oaklyn, $83,000; plumbing and heating, to Snooks & Girard, Millville, $7,827 and $11,416 respectively. Noted Jan. 3, C. D.—Jan. 9, E. N.-R., under Hopewell. **(Correction**—location.)

N. J., East Windsor—Bd. Educ, general contract school, to Matthews Constr. Co., Princeton, $85,997***structural steel and iron, to Elizabeth Iron Wks., 127 Franklin St., Elizabeth, $9,743***heating and ventilating, to F. P. Farrell, 269 Camden St., Newark, $15,997. Grand total $111,737. **P.W.A.** Noted Nov. 29, C. D.

N. J., Hohokus—Bd. Educ., Boro Hohokus, constructing Junior-Senior High School, to E. M. Johnson, Inc., 706 Bergen Ave., Jersey City, $126,377***plumbing, to F. A. McBride Co., 327 Grand St., Paterson, $14,177***heating, to E. J. Wohrle, 427 Palisade Ave., Cliffside, $22,560***electrical work, to P. H. Jaehnig, Inc., 106 Academy St., Newark, $10,450. Grand total $173,564. **P.W.A.** Noted Dec. 11, C. D.—Dec. 19, E. N.-R.

N. J., West Orange—Town, Gaston St. Auditorium, general contract constructing municipal building and garage, to Schurman Constr. Co., 782 Paterson Ave., Passaic, $131,200***structural steel, to Oltmer Iron Wks., 326 Manhattan Ave., Jersey City, $18,245***plumbing, to F. & W. V. Engelberger, 159 Jeliff Ave., Newark, $8,825***heating and ventilating, to Jaehnig & Peoples, Inc., 230 13th St., Newark, $10,264***electrical work, to C. P. Hansen, 230 New St., Belleville, $6,977***burglar alarm, to American Telegraph Co., 155 6th Ave., New York, $2,200***jail equipment, to Pouly Jail Building Co., 2215 DeKalb St., St. Louis, Mo., $2,765. Grand total $180,486. **P.W.A.**

N. M., Raton—Colfax Co., general contract 5 story, basement, brick, rein.-con. court house, plain found., to Frank Little Constr. Co., Amarillo, $212,826. Noted Dec. 23, C. D.—Dec. 26, E. N.-R.

N. M., Sante Fe—New Mexico Asylum for Deaf & Dumb, hospital administration, Cerrillo Rd., to J. F. Gagner, Albuquerque, $145,450. **P.W.A.** Bids Dec. 4. Noted Dec. 12, C. D.

New York—Willcox Constr. Co., general contractors, 25-20 41st St., Long Island City, 260 tons structural steel, for Richmond Health Center, Stuyvesant Pl. between Wall St. and Hamilton Pl., Richmond Boro., for Dpt. Health, 130 Center St., New York, to J. T. Ryerson & Son, 203 Woodside Ave., Jersey City, N. J. Noted Dec. 15, C. D.—Dec. 19, E. N.-R.

N. Y., Angola—B. Rebescher & Sons, Inc., general contractors, 110 Timon St., Buffalo, roofing for school, for Bd. Educ., to Carey Co., 1174 Niagara St., Buffalo***marble and tile, to Italian Mosaic Marble Co., 1085 East Delavan Ave., Buffalo***reinforcing steel, to Jalman Steel Co., Lackawanna. **P.W.A.** Bids Dec. 5. Noted Dec. 17, C. D.—Dec. 26, E. N.-R.

N. Y., Astoria — Siltuk Constr. Co., general contractors, 5 Skillman Pl., Long Island City, 125 tons structural steel for new health center, here, to Bethlehem Fabricators, Inc., 31 Union Sq., New York, for Dpt. Health, 139 Center St., New York. Noted Dec. 16, C. D.—Dec. 19, E. N.-R.

N. Y., Bath—F. Gleason Co., general contractors, 165 Colvin St., Rochester, sprinkler system in hospital, for Village, to Grinnell Co., 65 Bway., Rochester; elevator, to Warsaw Elevator Co., 191 Mill St., Rochester. **P.W.A.** Noted Jan. 13, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

†N. Y., Beacon—Summit Constr. Co., general contractors, 3 Beechwood Rd., Summit, N. J., reinforcing steel for U. S. Post Office, for Treas. Dpt. at office Sup. Archt., Wash., D. C., to Capitol Steel Corp., 186 Joralemon St., Brooklyn. Noted Jan. 3, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

N. Y., Binghamton—Bd. Educ., City Hall, excavation and foundation for high school, Howard Ave., to B. Klein, Corliss Ave. **P.W.A.** Bids Nov. 15. Noted Jan. 10, C. D.

N. Y., Brooklyn—Dpt. Hospitals, S. S. Goldwater, comr., 125 Worth St., New York, plumbing work for physicians residence, Kings County Hospital, to J. E. Eagan Co., 3013 Grand Concourse, New York, $42,700. Bids Dec. 19. Noted Dec. 10, C. D.—Dec. 12, E. N.-R.

†N. Y., Catskill—Franklin Goldsmith & Sons, general contractors, 814 Race St., Catasaqua, Pa., structural steel for U. S. Post Office, to Bethlehem Fabricators, Inc., 8th and West Lehigh Ave., Bethlehem, Pa.; plumbing and heating, to W. Bornstein, 1000 West Broad St., Bethlehem, Pa., for Treas. Dpt. at office Sup. Archt., Wash., D. C. Noted Nov. 25, C. D.—Nov. 28, E. N.-R., under "Contracts Awarded."

N. Y., Ithaca — A. H McPherson, general contractor, 201 White Park Rd, 120 tons structural steel for school additions for Bd. Educ., to Smith & Caffrey Co., Lodi St., Syracuse. **P.W.A.** Noted Dec. 17, C. D.—Dec. 26, E. N.-R.

†N. Y., Liberty—C. Anderson, general contractor, Box 63, Fort Montgomery, structural steel for U. S. Post Office, for Treas. Dpt. at office Sup. Archt., Wash., D. C., to Belmont Iron Wks., 44 Whitehall St., New York; mill work, to Baldwin Lumber Junction Milling, Inc., 112 Garfield Ave., Jersey City, N. J. Bids Oct. 7. Noted Nov. 12, C. D.—Nov. 14, E. N.-R.

N. Y., Lyons—Seneca Constr. Co., general contractors, Geneva, reinforcing steel and steel joists for infirmary, for Bd. Supervs. Wayne Co., to Concrete Steel Co., 207 James St., Syracuse. **P.W.A.** Bids Nov. 17. Noted Nov. 26, C. D.—Dec. 5, E. N.-R.

N. Y., New York—Dpt. Hospitals, S. S. Goldwater, comr., 145 Worth St., generators for Lincoln Hospital, to Fischback & Moore, Inc., 226 East 41st St., $36,400. Bids Dec. 19. Noted Dec. 19, C. D.—Dec. 12, E. N.-R.

N. Y., New York—J. L. Rice, comr. Dpt. Health, 139 Centre St., constructing Lower West Side Health Station, to Stock Constr. Co., Grand

Constr. News page 59

---

†*Federal Government.*

Public Buildings (Continued)

Central Terminal. $174,000. **P.W.A.** Bids Dec. 27. Noted Dec. 16, C. D.—Dec. 19, E. N.-R.

†N. Y., Rensselaer—L. Wexler, general contractor, Box 115 Schenectady, painting for U. S. Post Office, Bway., to R. Staley, 1238 Keyes Ave., Schenectady, for Treas. Dpt. at office Sup. Archt., Wash., D. C. Noted Oct. 23, C. D.—Oct. 31, E N.-R.

†N. Y., Rochester—H. Stallman Sons Co., general contractors, 135 Spring St., structural steel for U. S. Post Office Garage, for Treas. Dpt. at office Sup. Archt., Wash., D. C., to F. L. Hughes & Co., Inc., Lyell Ave. Noted Jan 2, C. D.—Jan. 9, E. N.-R.

N. Y., St. Albans—Bd. Educ., 500 Park Ave., New York, constructing Public School 136 addition, to Dover Constr. Co., Inc., 53 Greene St., New York, $147,200. **P.W.A.** Bids Jan. 3. Noted Jan. 6, C. D.

N. Y., Springfield—Bd. Educ., 500 Park Ave., New York, heating for Andrew Jackson High School, to Almirall & Co., Inc., 53 Park Pl., New York, $235,984***electrical work, to Jantlous Electric Equipment Co., 210 East 40th St., New York, $94,400***fixtures, to Simes Co., Inc., 22 West 15th St., New York, $21,559. Grand total $359,943. Bids Dec. 10. Noted Dec. 11, C. D.

N. Y., Troy—Marinello & Stanco, general contractors, 6 Summit Ave., Albany, structural steel for school, to Steel Fabricating Co., Milton, Pa., for Bd. Educ., City Hall. **P.W.A.** Bids Oct. 18. Noted Dec. 10, C. D.—Dec. 12, E. N.-R., under "Contracts Awarded."

N. Y., Wassaic—W. E. Wark Co., Inc., general contractors, 1608 Walnut St., Phila., Pa., structural steel for employees building and service connections at Wassaic State School, for Dpt. Mental Hygiene, Albany, to Belmont Iron Wks., 22nd and Washington Aves., Phila., Pa.; masonry, partitions, to Martin Fireproofing Co., McKinley Bldg., Buffalo. Noted Dec. 12, C. D. —Dec. 19, E. N.-R., under "Contracts Awarded."

★ **N. Y., Watervliet**—Bd. Educ., Watervliet, general contract school, 14th St., to J. J. Turner & Sons, Inc., 20 Edward St., Amsterdam. $382,827***heating, to T. G. Egan Refractory Eng. Co., 70 Kane St., Brooklyn, $65,331***plumbing, to Cohn & Kramer, 48 Grand Ave., $28,300***electrical work, to J. M. Stanley, 65 Brookline Ave., Albany, $22,300. Grand total $498,758. Concrete underpass, to O'Day Constr. Co., 400 Madison Ave., New York. Total est. $713,900. **P.W.A.** Bids Dec. 20. Noted Jan. 7, C. D.—Dec. 12, E. N.-R.

O., Akron—Akron University, Carroll & Summer Sts., constructing 3 story engineering school building. $220,000. Owner will construct by purchase of materials and W.P.A. labor. M. E. Harpster, 2nd Natl. Bank Bldg., archt. Noted Dec. 9, C. D.—Dec. 12, E. N.-R.

O., Toledo—City **(a)** general contract **(b)** heating, plumbing, ventilating **(c)** electrical work **(d)** heating and ventilating **(e)** plumbing **(1)** Indiana School **(2)** Fulton School **(3)** Newton School **(4)** Newbury School **(5)** Monroe School, to Comte-Naumann, 912 Summit St., **(a1)** $31,300 **(a2)** $38,000***to W. G. Coyle. 535 Knower St., **(b1)** $10,857***to Pioneer Plumbing & Heating, 136 West Woodruff St., **(b2)** $10,500***to Overmeyer Electric Co., Toledo, **(c2)** $1,879 **(c3)** $1,784***to H. J. Spieker Co., 1418 Elms St., **(a3)** $31,500 **(a4)** $34,000 **(a5)** $32,000***to Kaighin & Hughes, Toledo, **(b3)** $19,793 **(d4)** $18,515 ***to J. Thom, 340 Prouty Ave., **(e4)** $1,740 ***to D. MacDermid, 309 West Bancroft St., **(b5)** $16,981***to Romanoff Electric Co., 105 Broadway, **(c5)** $2,407. Grand total $251,256.

Ore., Salem—City, general contract 3 story, basement, school, to Drake, Wyman & Vose, U. S. Bank Bldg., Portland, $127,500. **P.W.A.** Bids Dec. 31. Noted Jan. 13, C. D.—Dec. 19, E. N.-R.

Pa., Grove City—Grove City College, general contract Mary Anderson Pew dormitory for women and an addition to I. C. Ketler men's dormitory, to Cook Anderson Co., Beaver, $206,345***heating and plumbing, to H. E. Ash Co., Grove City, $24,435***electrical work, to C. Beckley, Inc., Warren, $9,238. Grand total $240,018. Bids Jan. 3. Noted Dec. 27, C. D. —Nov. 14, E. N.-R.

R. I., Howard (Cranston)—State Emergency P. Wks. Comn., State House, Providence, electrical work for auditorium, gymnasium and swimming pool at Sockanosset Reformatory School, to Scannevin & Potter, 189 Pine St., Providence, $4,243. Bids Dec. 18, awarded Jan. 14. Noted Jan. 16, C. D., under "Contracts Awarded."

★ **R. I., Howard** (Cranston)—State, Emergency P. Wks. Comn., State House, Providence, general contract building for disturbed men and building for disturbed women, both 3 story, basement, to Matthew Cummings Co., 43 Tremont St., Boston, Mass., $510,000. **P.W.A.** Bids Dec. 19, awarded Jan. 14. Noted Dec. 18, C. D.

R. I., Howard (Cranston)—State, Emergency P. Wks. Comn., State House, Providence, general contract 2 story, basement, academic and vocational school at Sockannosset School, to O. D. Purington Co., Inc., 49 Westminster St., Providence, $123,956. **P.W.A.** Bids Dec. 9, awarded Jan. 13. Noted Dec. 18, C. D.

R. I., Howard (Cranston)—State, Emergency P. Wks. Comn., State House, Providence, general contract 2 story, basement, auditorium, gymnasium and swimming pool, at Sockannosset Reformatory, to O. D. Purington Co., Inc., 49 Westminster St., Providence, $135,700. **P.W.A.** Bids Dec. 18, awarded Jan. 13. Noted Jan. 3, C. D.

R. I., Howard (Cranston)—State Emergency P. Wks. Comn., State House, Providence, general contract, not incl. heating, plumbing and electrical work, 2 story, basement, employees dormitory at Mental Hospital, to Rowley Constr. Co., 260 Central Ave., Pawtucket, $196,800*** general contract altering and constructing additions to main dining room at State Infirmary, incl. heating, plumbing and electrical work, to Coleman Constr. Co., Inc., 86 Weybosset St., Providence, $41,875***general contract auditorium and chapel, Mental Hospital, to Cruise Constr. Co., 19 Dexter St., Pawtucket, $102,000 ***heating for same, to Files Eng. Co., 31 Bourne St., Providence, $11,994***plumbing for same, to American Plumbing Co., 205 South Main St., Providence, $5,825***electrical work for same, to New England Machine & Electric Co., 77 Bayley St., Pawtucket, $5,937. Grand total $364,431. **P.W.A.** Bids Dec. 6 and 7, awarded Jan. 9 and 13. Noted Dec. 17, C. D.

★ **R. I., Westerly—Town, W. H. Bacon, chn.** School Building Comn., Town Hall, general contract Senior High School, 3 story, basement, 148x151 ft., Ward Ave., to Mondelci & Benvenuti, 16 Elm St., New London, Conn., $289,500 ***heating, to Lincoln & Lane Co., 30 Bayley St., Pawtucket, $39,590***ventilating, to W. Law, 508 Prairie Ave., Providence, $9,100*** plumbing, to J. P. Cuddigan, 938 Broadway, East Providence, $21,743***electrical work, to Whitall Electric Co., Westerly, $15,296. Grand total $405,229. **P.W.A.** Bids Dec. 12, awarded Jan. 2. Noted Dec. 19, C. D.

S. D., Brookings—Bd. Educ., J. E. Martin, clk., general contract school, to R. A. Mark, Brookings, $125,000. **P.W.A.** Noted Dec. 30, C. D.—Jan. 2, E. N.-R., under "Contracts Awarded."

Tex. Denton — North Texas State Teachers College, c/o W. J. McConnell, bus. mgr., foundation for 144x204 ft. rein.-con. library building, to Jas. T. Taylor, Inc., 605 1st Natl. Bank Bldg., Fort Worth, $14,990. Total est. $200,000. **P.W.A.** Noted Dec. 11, C. D.

†Tex., Galveston—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing and relocating certain structures at Senior Medical Officers Quarters, to W. M. Rouch, Galveston, $34,879. Noted Jan. 3, C. D.

Wash., Sedro-Woolley — State Hospital, constructing receiving ward hospital, to S. C. Ericksen, 1248 South Ainsworth St., Tacoma, $248,889***electrical work, to Meacham & Babcock, Mutual Life Bldg., Seattle, $11,986*** plumbing, to A. J. Blythe, 1313 Railroad Ave., Bellingham, $30,889***heating, to Rautman Plumbing & Heating Co., 115 Jackson St., Seattle, $32,172. Grand total $323,936. **P.W.A.** Noted Jan. 3, C. D.

Wash., Spokane — City, furnishing turbines and generators for upriver power plant, to Allis-Chalmers Co., 1126 South 70th St., $286,750. Noted Dec. 6, C. D.—Dec. 12, E. N.-R.

†C. Z., Coco Solo—Yards & Dock, Navy Dpt., Wash., D. C., constructing buildings and roadways, Spec. 8124, to W. P. Thurston Co., Inc., 301 South 4th St., Richmond, Va., $276,000. Bids Jan. 8. Noted Jan. 3, C. D.

COMMERCIAL BUILDINGS

PROPOSED WORK

Ala., Mobile—Dauphin Way Baptist Church plans church $150,000. Architect not appointed.

Conn., Hartford—Caledonian Insurance Co. of Scotland, 555 Asylum St., plans by C. J. Malmfeldt, 36 Pearl St., 2 story, basement, pent house, brick, limestone, granite, steel insurance building, Garden and Cogeswell Sts. $150,000. Noted Dec. 5, C. D.—Dec. 12, E. N.-R.

Conn., West Hartford (br. Hartford) — St. Thomas the Apostle Parish, J. F. Callahan, pastor, plans brick, stone parochial school. $145,000. Architect not appointed.

Ill., Chicago—Field Estate plans by Graham, Anderson, Probst & White, Railway Exchange Bldg., constructing 3 story, basement, brick apartment, store and theatre, plain found., in block 71st St., South Shore Ave., 70th Pl. and Oglesby St. $250,000.

Me., Freeport—Lenox Shoe Co. plans by J. P. Thomas, 537 Congress St., Portland, model housing project, twenty-five 4 family units of various sizes. To exceed $140,000. May be built with federal funds.

★ **Mass., Brighton** — Commonwealth Heights Development Co., c/o Kendall, Taylor & Co., 209 Columbus Ave., Boston and G. E. Robinson, 80 Federal St., Boston, archts., sketches apartment building, Commonwealth Ave. between Washington and Warren Sts. $5,000,000. **Maturity indefinite.**

Mich., Kalamazoo—Protestant Christian Reformed Church, South Park St., plans repairing and rebuilding church. Est. about $140,000. Architect not appointed.

★ **Mo., Kansas City—A. R. Jones**, 15 West 10th St., plans by Hoit, Price & Barnes, Telephone Bldg., altering and redecorating inside 23 story Hotel Kansas City, 11th and Baltimore Sts. $500,000.

Mo., Kansas City—William Snyder, Commerce Trust Bldg., plans by P. T. Drotts, Reliance Bldg., completing 10 story, basement hotel, 35th and Gillham Sts. $400,000.

N. J., Atlantic City—Hotel Biltmore, 19 South Rhode Island Ave., plans hotel, 19 South Rhode Island Ave. To exceed $150,000. Architect not appointed.

N. J., Teaneck—Corp., c/o A. Summer, [illegible] Queen Ann Rd., plans store and office on Cedar Lane. $140,000. Architect not appointed.

★ **N. J., Teaneck—Louis Gold Co.**, 122 East 42nd St., New York, N. Y., plans by E. McMurray, 982 Stuyvesant Ave., Union, archts., residence development of one hundred twenty-five 2½ story, basement buildings, on Teaneck Rd. $1,150,000 plus.

★ **N. Y., Eastchester—Corporation,** c/o Murgatroyd & Ogden, archts., 285 Madison Ave., New York, plans three 6 story, brick, steel apartments, plain founds., in Garth Wood Section. $800,000.

N. Y., Elmira—Elmira Savings Bank, S. Lowman, pres., Elmira, plans rebuilding bank building, Water St. **$150,000 or more.**

N. Y., Flushing—Bobrose Development Corp., 190-05 Crocheron Ave., plans group 20 or more dwelilngs, 24th Rd. off 169th St. To exceed $140,000.

N. Y., Great Neck—Callan Bros., 166-30 26th Ave., Flushing, plans developing tract and constructing group of dwellings on 20 acres, Great Neck Hills, Schenck Ave. and Shorewood Dr. To exceed $150,000. Architect not appointed.

N. Y., Jackson Heights — Jackson Heights Corp., A. Shanik, pres., 26 Court St., plans by Kavy & Kavovitt, 16 Court St., Brooklyn, 6 story, brick apartment, 73rd St. near 35th Ave. $160,000.

N. Y., Jamaica—John Mullins & Sons, 84 Myrtle Ave., Brooklyn, plans constructing 4 story store, 168th St. and Jamaica Ave. $150,000. Site purchased.

N. Y., New York—Corporation, c/o L. Minoff, 1606 Jerome Ave., plans by C. Schaefer, Jr., 332 East 149th St., 6 story, 85x170 ft., brick apartment, 173rd St. and Selwyn Ave. Est. about $140,000.

N. Y., New York—Marion Avenue Development Co., Inc., 350 East 194th St., plans by I. L. Crausman, 332 East 149th St., 6 story, 82x88 ft., brick apartment, Marion Ave. near Bedford Park Blvd. $140,000.

N. Y., New York—J. Sager, 612 West 145th St., plans apartments, 178th St. and Anthony Ave. $350,000. Site acquired.

N. Y., Syracuse—New York Central R. R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, plans purchasing boiler house equipment, for mail and service building, also air, steam and water line connections in railroad station.

N. Y., Valley Stream—Corporation, c/o J. Schlossman, Valley Stream Park, Valley Stream, plans (2nd unit), group 50 brick, stone dwellings. To exceed $250,000.

O., Cleveland — Great Lakes Exposition Co., Lincoln Dickey mgr., Terminal Tower, receiving competitive sketches from architects main entrance to exposition building, at Lake Front. $150,000.

★ **Ore., Portland**—Montgomery Ward & Co., West Chicago Ave. and North Larrimore St., Chicago, Ill., soon lets contract 1 story, basement, rein.-con. store building. $750,000. Private plans. Noted Nov. 15, C. D.—Nov. 21, E. N.-R.

R. I., Providence—Owner, c/o D. Shapiro, archt., 58 Weybosset St., Providence, making plans 34 suite apartment building, Waterman and Medway Sts. To exceed $150,000.

Wash., Seattle—Swedish Hospital sells adjoining clinic building to Seattle Eye, Ear, Nose & Throat infirmary so it may be moved and site cleared for construction of north wing to hospital, on 817 Summit St. $250,000.

Wash., Spokane — B. Goldstein, Roosevelt Apts., 524 7th Ave., plans 6 story apartment, 6th and Howard Aves. $450,000.

Man., Winnipeg—Franciscan Missionaries of Mary plans constructing institution. Architect not appointed.

N. S., Kentville—Kentville Hospital Assn. plans hospital. $140,000. **Maturity in spring.**

BIDS ASKED

N. H., Concord—Cram & Ferguson, archts., 248 Boylston St., Boston, Mass., taking bids brick, stone, granite church, concrete found., for First Congregational Church. R. F. Beyer, pastor, 6 Franklin St. $150,000. Noted Nov. 14, C. D.—Nov. 21, E. N.-R.

N. J., Bound Brook—See "Contracts Awarded."

N. Y., Beechhurst—See "Contracts Awarded."

N. Y., Brooklyn — Brooklyn Hebrew Home Hospital, bids about Mar. 1, constructing 6 story hospital, 813 Howard Ave. $350,000. W. I. Hohauser, 1841 Bway., New York, archt. Noted Dec. 11, C. D.—Dec. 19, E. N.-R.

N. Y., Coxsackie—Feb. 11, by Dpt. Correction, State Office Bldg., Albany, brick, steel staff accommodation building, plain found., at Vocational Institute. W. E. Haugaard, state archt., and T. F. Farrell, state engr., both State Office Bldg., Albany.

N. Y., Douglaston—See "Contracts Awarded."

N. Y., Flushing—See "Contracts Awarded."

N. Y., Merrick—See "Contracts Awarded."

†Federal Government

Commercial Buildings (Continued)

N. Y., Newark—Feb. 19, by Dpt. Mental Hygiene, State Office Bldg., Albany, constructing farm colony building, Newark State School. W. E. Haugaard, state archt., and T. F. Farrell, state engr., both State Office Bldg., Albany.

N. Y., Scarsdale—See "Contracts Awarded."

N. Y., Schenectady—Jan. 28, by St. Lukes Roman Catholic Church, 1202 State St. (invited list of bidders), constructing church, State St. $140,000. J. J. O'Shaughnessy, 146 State St., Albany, archt. R. D. Kimball Co., 6 Beacon St., Boston, Mass., engrs. Noted Jan. 7, C. D.—Jan. 9, E. N.-R.

N. Y., Whitestone—See "Contracts Awarded."

N. Y., Woodside—See "Contracts Awarded."

Wis., Shorewood—Feb. 1, by E. Brielmaier & Sons Co., archts., 735 North Water St., Milwaukee, 1 story, basement, 85x163 ft., brick, steel church, plain found., for St. Roberts Catholic Congregation, 2200 East Capitol Dr. Maginnis & Walsh, Statler Bldg., Boston, Mass., archts.

CONTRACTS AWARDED

Calif., Los Angeles—Pacific Mutual Life Insurance Co., 6th and Olive Sts., modernizing and improving 6 story, basement office building, 6th and Olive Sts., to Ford J. Twaits Co., 806 Architects Bldg. Est. $250,000. Parkinson & Parkinson, 808 Title Insurance Bldg., archts.

Calif., San Francisco—Monson Bros., general contractors, 475 6th St., terra cotta for telephone exchange building, to Gladding-McBean Co., 660 Market St., for Pacific Telephone & Telegraph Co., 140 New Montgomery St.*** masonry, to White & Gloor, Monadnock Bldg. ***reinforcing steel, to Gunn, Carle Co., 20 Potrero Ave. Noted Nov. 8, C. D.—Nov. 14, E. N.-R., under "Contracts Awarded."

Calif., Westwood—Janss Investment Co., 1081 Westwood Blvd., 2 story, basement, 100x100 ft., Class A store building, Westwood Blvd. and Kinross Ave., to P. J. Walker Co., 3900 Whiteside St., Los Angeles. $250,000. Sears, Roebuck Co., lessee. P. P. Lewis, 1063 Westwood Blvd., archt.

Ga., Atlanta—Rich's, Inc., air conditioning work for department store, to York Ice Mchy. Co., York, Pa., to exceed $100,000. Noted Oct. 25, C. D.—Oct. 31, E. N.-R.

La., New Orleans—Leo Weil & Walter Moses, engrs., 427 South Peters St., installing 100 ton air conditioning system in 7 story building, for Leon Godehaux Clothing Co., Ltd., to Crawford, Inc., 216 Baronne St., New Orleans. Noted Dec. 17, C. D.

★ **N. J., Bound Brook**—Schwartz Land & Impvt. Co., 154 Nassau St., New York, constructing 2½ story, basement, brick, stone veneer residential development, day labor and separate contracts. $500,000 plus. Noted Jan. 15, C. D.—Jan. 23, E. N.-R.

N. J., South Orange—A. A. Broderson, Self Pl., constructing tract development and group of brick dwellings, on Self Pl., separate contracts awarded. $140,000.

N. Y., Beechhurst—Beechhurst Homes, Inc., Bank of Manhattan, Jamaica Ave., Jamaica, group frame dwellings, 16th Ave. and 163rd St., day labor and separate contracts. $140,000. A. Fahr, c/o owner, archts. Noted Nov. 27, C. D.—Dec. 5, E. N.-R.

N. Y., Brooklyn—Amche Holding Co., 2156 East 36th St., group 2 story dwellings, Avenue T and 33rd St., separate contracts now being awarded. To exceed $100,000. R. Schaefer, c/o owner, archt. Noted Nov. 20, C. D.—Nov. 28, E. N.-R.

N. Y., Brooklyn—Parkway Terrace, Inc., 44 Court St., 6 story apartment, 501 Avenue J, separate contracts now being awarded. $180,000. M. N. Weinstein, 93 Court St., archts. Noted Oct. 18, C. D.—Oct. 24, E. N.-R.

N. Y., Douglaston—United Associates, Northern Blvd. and 245th St., group of frame dwellings, Northern Blvd. and 245th St., separate contracts. $140,000. Private plans. Noted Dec. 31, C. D.—Jan. 9, E. N.-R.

N. Y., Flushing—Thebes Realty Corp., 38-17 Bell Ave., Bayside, constructing group dwellings, 172nd St. and Bayside Ave., separate contracts. $140,000. J. Unger, 3901 Main St., Flushing, archt.

N. Y., Maspeth—Alden Terrace Homes, Inc., 89-17 161st St., Jamaica, constructing group 12 or more dwellings, Dry Harbor Rd. and Cowles Ave., separate contracts now being awarded. $140,000. C. Infanger, 2634 Atlantic Ave., Brooklyn, archt. Noted Dec. 18, C. D.—Dec. 26, E. N.-R.

N. Y., Merrick—Merrick Homes Development Co., group 100 frame and brick dwellings, Merrick Wood, day labor and separate contracts. To exceed $140,000. Noted Dec. 31, C. D.—Jan. 9, E. N.-R.

N. Y., New York—Emerdyke Corp., c/o H. I. Feldman, archt., 15 West 44th St., general contract 6 story, brick apartment, Bway. near 207th St., to H. M. Hughes Constr. Co., 30 East 42nd St. Est. $350,000.

N. Y., New York—Hope Concourse Realty Corp., 1015 Sherman Ave., 6 story, brick apartment, Mount Hope Ave. and Grand Concourse, separate contracts awarded. $150,000. C. Kreymborg, 902 Gerard Ave., archt. Noted Nov. 26, C. D.—Dec. 5, E. N.-R.

N. Y., New York—Leroy Haven, Inc., 565 5th Ave., constructing 6 story store and apartment, Grand Concourse and 181st St., separate contracts now being awarded. $250,000. H. Ginsbern, 205 East 42nd St., archt. Noted Dec. 11, C. D.—Dec. 19, E. N.-R.

N. Y., New York—New York State Realty & Terminal Co., 466 Lexington Ave., altering 12 story store and apartment, 400 Park Ave., to G. A. Fuller Co., 597 Madison Ave. Est. $200,000. Walker & Gillette, 599 Madison Ave., archt. Noted Dec. 11, C. D.—Dec. 19, E. N.-R.

N. Y., St. Albans—Ringhoff & English, 199-16 Hollis Ave., Hollis, constructing group 2 story, 29x32 ft. frame dwellings, Adelaide Lane near 175th St., separate contracts now being awarded. $140,000. F. J. Burmeister, 155-31 Jamaica Ave., Jamaica, archt. Noted Dec. 13, C. D.—Dec. 19, E. N.-R.

N. Y., Scarsdale—Everett Jacobs, Fenimore Rd., constructing group 50 dwellings, on 31 acre tract, Harney Rd., separate contracts. To exceed $140,000. Now taking bids. Noted Dec. 31, C. D.—Jan. 9, E. N.-R.

N. Y., Syracuse—St. Lucy's Roman Catholic Church, 432 Gifford St., general contract auditorium and recreational building, to Byrne Constr. Co., 411 Roberts Ave. Noted Apr. 9, 1935, C. D.—Jan. 17, 1935, E. N.-R.

N. Y., Whitestone — Southgate Eng. Corp., 151-70 10th Ave., constructing (2nd unit), group 2 story, frame, brick dwellings, 152nd St. and 10th Ave., day labor and separate contracts. $150,000. Private plans.

N. Y., Woodside—Dick Meyer Corp., 62 William St., New York, 2 story theatre and store, 31st Ave. and 51st St., separate contracts. $150,000. C. A. Sandbloom, 145 West 45th St., New York, archt. Noted Nov. 27, C. D.—Dec. 5, E. N.-R.

O., Cleveland—C. Bernstein, Society for Savings Bldg., 3 story, basement, 60x135 ft., brick, steel apartment, Kemper Rd., to W. Dolin Constr. Co., Society for Savings Bldg. Est. $150,000. J. H. Graham, Hall Bldg., archt.

Ont., Toronto — Casino Theatres Ltd., c/o Kaplan & Sprackman, archts., 305 Dundas St. W., general contract constructing 1 story, part basement, brick, steel theatre, Queen St. W., to United Bricklaying Co. Ltd., 276 Palmeeston Ave. Est. $110,000. Noted Dec. 18, C. D.

Que., Hull—Ed. Brunet & Son, general contractors, incinerators for sanatorium, Aylmer Rd., for Sisters of the Cross, to Francis Hankin Co. Ltd., 2028 Union St., Montreal***steel sash and window equipment, to Cresswell Pameroy Ltd., 3989 St. Ambroise St. W., Montreal*** waterproofing, to J. D. Sanderson, 575 McLeod St., Ottawa, Ont. Noted Dec. 30, C. D.—Jan. 2, E. N.-R.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ala., Brewton—GAS PLANT—City plans gas manufacturing plant. $50,000.

Ala., Decatur — PLANT — Cooper-Wells Co. (Hosiery Mfg.) soon lets general and separate contracts plant. $50,000. E. Steinberg, 205 West Wacker Dr., Chicago, Ill., archt.

Ala., Demopolis—STORAGE—Braswell Hardware Co. plans repairs and alterations to storage, distribution and showrooms. $37,000 with equipment. Architect not appointed.

Calif., Richmond—REFINERY EQUIPMENT—Standard Oil Co. of California, 225 Bush St., San Francisco, F. H. Dittus, ch. engr. Refinery Dpt., plans purchasing three 500 hp. Diesel engines coupled to 335 kw. generators, 400 hp. slow speed Diesel engine for pump operating purposes, eighteen 55,000 bbl. floating roof tanks to be used at proposed refinery to be built in Bahrein Island by subsidiary, Bahrein Petroleum Co. T. W. Barrington, purchasing dpt. of company, San Francisco, in charge. Noted Dec. 19, C. D.—Dec. 26, E. N.-R.

Calif., Salinas—ICE PLANT—Salinas Valley Ice Co., Salinas, R. Myers, mgr., plans 120 ton daily capacity ice plant, rein.-con. $100,000. Engineer not appointed.

Fla., Goulds—PLANT—Frederick Peters plans 2 story packing plant and distribution. $37,000 or more with equipment. R. T. Pancoast, 1st National Bank Bldg., Miami Beach., archt.

Fla., Miami — BOTTLING PLANT — Canada Dry Ginger Ale Co., 122 East 42nd St., New York, plans by W. M. Cory, archt. and engr., Box 111, Mt. Dora, bottling plant. $60,000. Noted Jan. 9, C. D.

Fla., Panama City—WAREHOUSE—Railway Express Agency, 230 Park Ave., New York, N. Y., soon lets general and separate contracts constructing warehouse. Private plans under G. J. Dye, supt. of buildings, 325 Mitchell St. S.W., Atlanta, Ga. Noted Dec. 31, C.D.—Jan. 9, E.N.-R.

Ky., Louisville—WAREHOUSE—Falls City Brewing Co., 31st St. and Broadway, plans by W. C. Wagner, Breslin Bldg., 4 story, brick, steel, concrete warehouse, insulated with cork and refrigerated throughout. $100,000.

Ky., Owensboro—PLANT—Owensboro Sewer Pipe Co. plans plant. To exceed $50,000. Architect not appointed.

Ky., Paducah — HOSIERY MILL — Paducah Hosiery Mill plans repairs and alterations to hosiery mills. $50,000.

La., Gretna—PLANT—Johns-Manville Products Corp., R. B. Murphy, supt., plans 1 story, 150x800 ft., structural steel plant.

★ **La., Jefferson Parish**—PLANT, etc.—Johns Manville Co., 22 East 40th St., New York, plans plant, power plant, shops, etc. $700,000.

La., Lake Charles—TERMINAL—Continental Oil Co. soon lets contract terminal on Calcasieu River, incl. 500 ft. dock, two 80,000 bbl. storage tanks, also 10,000 bbl. tank and other work, $350,000.

Me., Portland—BAKERY—Cushman Baking Co., 107 Elm St., plans by John Calvin Stevens & J. H. Stevens, 187 Middle St., 2 story, basement, brick, steel bakery addition, concrete found., Elm and Lancaster Sts. To exceed $40,000.

Mass., Boston—STORAGE, etc.—Armour & Co., Union Stockyards, Chicago, Ill., plans storage building, $275,000; and garage, $35,000 on land owned by New York, New Haven & Hartford R. R., New Haven, Conn.

Mass., Gardner—FACTORY—Florence Stove Co., 205 School St., soon lets contract 2 story, basement, 150x300 ft., brick, steel storage unit, rolling steel shutter doors, track doors, hard burnt salt glazed tile partitions. $100,000. Frank D. Chase, Inc., 307 North Michigan Blvd., Chicago, Ill., archts. and engrs.

Mass., Greenfield—NEWSPAPER—Greenfield Recorder-Gazette, H. I. Jenks, bus. mgr., plans rebuilding newspaper building. To exceed $37,000. Architect not appointed.

Mich., Ann Arbor—GARAGE—Artificial Ice Co. plans garage, $37,000 with equipment. **Maturity indefinite.** University City Garage, 315 West Huron St., Lessee. Architect not appointed.

Mich., Saginaw—PLANT—North American Petroleum Co. purchased former Peerless Oil Company's 500 bbl. skimming plant on Carrollton Rd. and plans enlargements to increase capacity to 3,000 bbl. per day. Private plans.

Minn., Winona — CREAMERY — Marigold Dairies, Inc., W. R. Cammack, secy.-treas., 226 North Smith Ave., St. Paul, plans by C. A. Berger, 501 Phoenix Bldg., Minneapolis, 1 story, basement, 60x91 ft., rein.-con., steel, brick creamery, 117-121 East 4th St. $37,000.

Miss., Vicksburg—FACTORY—City, c/o R. J. Perry, Perry Lumber Co., plans by Krouse & Brasfield, Meridian, 1 story, modern garment factory building, $80,000. M. Fine & Son Mfg. Co., Inc., New York, lessee.

Mo., North Kansas City — RESEARCH — C. Cook, Cook Paint Co., 1412 Knox St., making plans constructing 4 story, brick, concrete research building, 1412 Knox St. $50,000. Private plans.

Neb., Omaha—BREWERY IMPROVEMENTS—Falstaff Brewing Corp., 25th and Krug Ave., plans extensive improvements, will purchase complete bottling unit, washer, filler, crowner and labeler, extensive new refrigeration equipment, fermenting and storage equipment. $150,000.

Neb., Omaha — DISTILLERY — Agricultural Power Alcohol Corp., P. A. Tomek, David City, plans reconditioning distillery, 4th and Pine Sts. $100,000.

Neb., Omaha—PLANT—Independent Biscuit Co., Omaha, making plans installing traveling ovens, conveyors, complete icing equipment and refrigeration, cracker ovens in plant. $50,000.

Nev., Mountain City—MILL—Mountain City Copper Co., Mountain City, plans constructing flotation mill. $250,000.

N. H., Hinsdale—PAPER MILL—Cheshire Paper Co., H. S. Garfield, vice pres., plans rebuilding brick, steel, concrete paper mill, Main St. recently destroyed by fire. To exceed $100,000. McClintock & Craig, 458 Bridge St., engrs.

N. H., Hinsdale—PLANT—White-Washburne Co., Inc., Main St., sketches by McClintock & Craig, 458 Bridge St., Springfield, Mass., rebuilding, brick manufacturing plant. $80,000.

N. J., Harrison—PLANT—National Oil Products Co., Essex St., plans plant repairs and alterations to former Manufacturers Can Co. plant. To exceed $37,000.

N. J., Jersey City—PLANT—Oldetyme Distillers Co., 122 East 42nd St., New York, L. Schwartz, in charge, plans improving bottling and distribution facilities of former Hiram Walker plant, Lackawanna Terminal, recently acquired To exceed $40,000 with machinery and equipment.

N. J., Manville — PLANT — Johns Manville Co., 22 East 40th St., New York, plans plant improvements and betterments. To exceed $70,000.

N. J., Rahway—PLANT—Meck & Co., Lincoln Ave., plans plant addition and improvements. $40,000.

N. Y., Brooklyn—FACTORY—Allied Industrial Alcohol Corp., Kane and Van Brunt Sts., plans by E. M. Wharff, c/o owner, altering 7 story factory, 37 Irving St. $37,000 with equipment.

N. Y., Brooklyn—FACTORY—American Can Co., 230 Park Ave., New York, plans by Otis Elevator Co., 11th Ave. and 26th St., altering 6 story factory, incl. elevator work, 120 43rd St. $37,000 with equipment.

N. Y., Brooklyn—STORAGE—G. D. McCurdy, North Belmore, plans by W. A. Lacerenza, 391 Fulton St., 1 story, 80x220 ft., brick storage building, 169 Gardner Ave. $37,000 with equipment.

N. Y., Buffalo — BOAT WORKS — Buffalo Marine Constr. Co., A. E. Cornelius, in charge, foot Michigan St., plans constructing boat works and docks addition. $37,000 with equipment.

Constr. News page 61

---

†Federal Government.

Industrial Buildings (Continued)

N. Y., Buffalo — MACHINE SHOP — H. E. Plumer & Associates, archts., 755 Main St., Buffalo, soon let contract extensive changes and remodeling machine shop, Washington St., for Eastman Machine Co., Washington St. To exceed $37,000.

N. Y., Middletown—TANK SHOP, etc.—Middletown Brewing Co., c/o Whitman S. Wick, archt., 15 King St., plans constructing tank shop and cooperage shop, to exceed $37,000; and brewery and bottling plant, Highland Ave. $150,000.

N. Y., New York—GARAGE—Gerosa Haulage & Warehouse Corp., 280 East 137th St., plans by DeRose & Cavalieri, 370 East 149th St., 1 story, 100x200 ft. garage. $50,000.

N. Y., New York—PLANT—Corporation, c/o Cross & Brown Co., 270 Madison Ave., plans altering and equipping plant, Park Ave. and Walworth St. Est. about $37,000 with equipment. Moriarty-Johnson Co., 5 Washington Pl., lessee.

N. Y., Syracuse—WAREHOUSE—John Morrell & Co., Ottumwa, Ia., bids latter part January, brick, steel warehouse, plain found. To exceed $37,000. H. B. Henschein, 59 East Van Buren St., Chicago, Ill., archt. Noted Nov. 8, C. D.—Nov. 14, E. N.-R.

N. Y., Tonawanda — WAREHOUSE — Tonawanda Boxboards, Inc., plans constructing warehouse. $50,000. Architect and engineer not appointed.

N. C., Lumberton—WAREHOUSE—Carolina Warehouse plans 216x259 ft. tobacco warehouse covering area of 60,000 sq.ft. To exceed $37,000. **Maturity in February.**

O., Cincinnati—MANUFACTURING PLANT—Palmer Co., St. Bernard, bids about March, for thermometer factory, Reading Rd. and Tennessee Ave. Grunkenmeyer & Sullivan, 3717 Eastern Ave., archts. Noted Oct. 24, C. D.—Oct. 31, E. N.-R.

O., Cleveland—PLANT—Midland Steel Products Co., Madison Ave. and West 106th St., plans altering and equipping former Winton Motor Co. plant. $37,000 or more.

O., Cleveland—WAREHOUSE—J. C. Virden Co., H. B. McGraw, secy., 6001 Longfellow Ave., plans by J. W. Little, 2036 East 22nd St., 2 story, basement, 50x152 ft., **brick, steel warehouse** addition. $40,000.

O., Coshocton—FACTORY—Muskingum Fiber Products Co., H. N. Carpenter, pres., plans factory. $37,000 with equipment.

O., Martins Ferry — STEEL FURNACE — Wheeling Steel Co., Wheeling, W. Va., plans improving steel furnaces. To exceed $50,000.

O., Middletown—OFFICE, LABORATORY—American Rolling Mill Co. plans rebuilding 3 story, basement, brick, steel office, laboratory building. $75,000. $100,000 fire loss. Private plans.

O., Pemberville—STORAGE—Pemberville Elevator Co. plans storage. To exceed $40,000. **Maturity indefinite.** Architect not appointed.

O., Portsmouth—PLANT—Wheeling Steel Corp., Wheeling Steel Corp. Bldg., Wheeling, W. Va., plans steel products manufacturing plant improvements. To exceed $50,000.

★ **O., Steubenville**—PLANT—Wheeling Steel Co., Wheeling Steel Corp. Bldg., Wheeling, W. Va., plans improving and constructing additions to iron and steel products manufacturing plant. To exceed $500,000 with equipment.

O., Toledo—PLANT—Doehler Die Castings Co., Smead St. and Prospect Ave., bids in spring, addition to plant, will add 150,000 sq.ft. space. $300,000.

O., West Salem—GRAIN STORAGE—West Salem Equity Co. plans grain storage. To exceed $37,000 with equipment. **Maturity indefinite.**

O., Yorkville—PLANT—Wheeling Steel Corp., Wheeling Steel Corp. **Bldg., Wheeling, W. Va.,** plans steel finishing plant alterations. $100,000 or more.

Okla., Oklahoma City—CASING HEAD GASOLINE PLANT—Phillips Petroleum Co., Bartlesville, sketches made constructing casing head gasoline plant, 30th and Kelley Sts. $60,000. A. H. Riney, city engr.

Ore., Eugene—POWER PLANT—Eugene Utility Co., Eugene, plans removing and repairing Lake Walleville Power Plant. $30,000. J. W. McArthur, supt.

Pa., Carnegie—PLANT—Wettach Paint & Chemical Co., J. R. Stetler, secy., **purchased** former plant of H. L. Dixon Co., Rosslyn Rd., and plans rehabilitating, enlarging and installing machinery and equipment for manufacturing paints and chemicals. To exceed $37,000.

★ **Pa., Erie**—POWER PLANT—Hammermill Paper Co. plans **constructing power plant** for paper mill. $500,000.

Pa., Lancaster — PLANT — Lancaster Iron Wks. plans altering and repairing plant. **Est.** about $80,000. Architect not appointed.

Pa., McKeesport — PUBLISHING PLANT — McKeesport Daily News, Walnut St. and Jerome Blvd., plans by Hunting, Davis & Dunnells, Century Bldg., Pittsburgh, constructing 3 story, basement, 53x140 ft., brick, steel, terra cotta, concrete, Walnut St. and Jerome Blvd.

Pa., Phila. — PLANT — Container Corp. of America, 205 West Wacker Dr., Chicago, Ill., plans by R. Bencker, Horn Bldg., **constructing** additions to former Brandle & Smith plant, **5th** and Bristol Sts. $100,000.

Constr. News page 62

Pa., Pine Grove—COAL BREAKER—Lorberry Creek Anthracite Corp. plans modern coal breaker on Lorberry Creek, 4 mi. north of here. $28,500 or more.

Pa., Pottstown—PLANT—Doehler Die Casting Co., 2100 Smead Ave., Toledo, O., plans altering and reconditioning plant. $200,000.

★ **Pa., Sugarcreek Twp.** — PRESSURE PLANTS — Sloan & Zock Co., Bradford, plans pressure plants, utilizing air and gas, force recovery of crude oil throughout Sugarcreek Twp. oil field. $750,000 or more. H. L. Smith, c/o owner, engr.

Pa., Wilkes Barre—STORAGE—Crystal Bottling Co., 411 North Washington St., plans 1 story, rein.-con. storage plant. $28,000.

R. I., Saybrooke—MILLS—Saybrooke Woolen Mill, Saybrooke, plans woolen mills. $75,000 or more. **Maturity indefinite.** Architect not appointed.

S. C., Charleston—PETROLEUM TERMINAL—Southern States Oil Co., L. D. Long, pres., Meeting and Mt. Pleasant Sts., plans terminal for discharging tank steamships on Ashley River, near here. $35,000.

S. C., Chester—MILL—Springs Cotton Mills Co. soon lets contract 50x125 ft. mill additions. To exceed $28,000 with equipment.

S. C., Fort Mill—MILL—Springs Cotton Mills, Fort Mill, plans 2 story, 83x373 ft. addition **to Mill 1.**

Tenn., Bruceton—STORAGE—United Wholesale Grocery Co. plans storage and distribution. To exceed $40,000. Architect not appointed.

Tenn., Jackson—STORAGE—Rose Furniture Co. plans storage distribution and showrooms. To exceed $50,000. Architect not appointed.

Tenn., Memphis—PLANT—W. C. Nabors Co., Mansfield, La., plans alteration and addition to plant, 206 South Pauline St. $35,000.

Tex., Baytown—POLYMERIZATION PLANT—Humble Oil & Refining Co., Humble Bldg., Houston, and 602 El Paso St., San Antonio, sketches polymerization plant. $450,000. Engineer, c/o Owner's Engineering Dpt., engr.

Tex., Big Springs—REFINERY—Cosden Oil Co., Big Springs, plans reconditioning and remodeling refinery, cracking unit into Dubbs cracking unit, 7,000 bbl. daily capacity. To exceed $40,000. Universal Oil Products Co., 30 Rockefeller Plaza, New York, engrs.

Tex., Cameron — FACTORY — Kraft-Phoenix Cheese Corp., Waco, plans 1 story, brick, rein.-con. cheese factory, plain found. $40,000. Private plans.

Tex., Dallas—DAIRY PLANT—Oak Farm Milk Co., c/o A. B. Moore, 324 Beckleywood St., plans dairy plant, North Lancaster St. Est. $37,000 with equipment.

Tex., Houston — PLANT, etc. — Golden Gate Wine Co., 1107 Wood St., plans altering bottling plant and storage, 1107 Wood St. $50,000.

Tex., Wichita Falls—STORAGE, etc.—Wigley Furniture Co. plans alterations and repairs to storage, showrooms and refinishing plant. **Est.** about $37,000. Architect not appointed.

Va., Hampton—FERTILIZER WORKS—R. C. Lee plans fertilizer works. $37,000. **Maturity indefinite.** Architect not appointed.

Va., Richmond—PLANT—Cavalier Distributing Corp., 2100 Westwood Ave. plans plant, 2100 Westwood Ave. $45,000.

Va., Victoria—SILK MILLS—Broad Silk Co., Hanover, Pa., plans constructing 5 units silk mills. $16,000 each. Total $80,000.

Wash., Aberdeen—DISTRIBUTION and STORAGE—Ice Delivery Co., 115 Bell St., Seattle, plans distribution and storage addition. $37,000 with equipment.

Wash., Bellingham—BREWERY—Bellingham Brewing Co., Marietta Rd., plans by C. Linde, Bellingham, 3 story brewery. To exceed $50,000.

Wash., Salkum—PLANT—Floyd Duell, mgr., Chehalis Mill Co., announces early reconstruction of plant. $100,000.

Wash., Tacoma — PLANT — Balfour-Guthrie Co. Ltd., Tacoma Bldg., plans plant repairs and alterations. To exceed $60,000.

Wash., Tacoma—PLANT—Waterside Milling Co., 911 Dock St., plans repairs and alterations. To exceed $50,000.

W. Va., Wheeling—PLANT—Wheeling Steel Corp., Wheeling Steel Corp. Bldg., plans improving steel finishing plant. To exceed $37,000.

Wis., Owen—PLANT—Carnation Milk Co., 715 North Van Buren St., Milwaukee, plans improving and repairing former Oatman Milk Co. plant, recently acquired. To exceed $37,000 with equipment. **Maturity indefinite.**

★ **Canada** — SHOPS — Canadian Natl. Rys., Montreal, Que., plans betterments and repairs of equipment in shops at Moncton, N. B., Rivere du Loup, St. Malo and St. Charles, Que., London and Stratford, Ont., Transcona and Fort Rouge, Man., Edmonton, Alta. $1,000,000.

Alta., Mayerthorpe — POWER PLANT — E. Loucks preparing plans power plant.

B. C., Burnaby—PLANT—Pacific Coast Packers Ltd., Telford Ave., bids about 2 months 1 story each, fruit and vegetable canning plants, candy factory and mayonnaise factory, timber, plain founds., on 3 acre site, McPherson St. $50,000. Site being cleared. Engineer and architect not appointed.

B. C., Edwards—FACTORY—Pacific Coast Packing Co. Ltd., prepares plans canning factory. $50,000. Will be in market for machinery.

B. C., Emory Creek—MINES—B. C. Nickel Mines, Ltd., preparing plans 2,000 hp. additional development. **Maturity in spring.**

B. C., Nanaimo — MILL — Syndicate, c/o J. Barsby, mayor, preparing plans constructing lumber mill on assembly wharf. $200,000.

B. C., New Westminster — TERMINALS — Pacific Coast Terminals Ltd., preparing plans construction terminals during 1936. To exceed $300,000.

B. C., Quesnel—PUMPING PLANT—Bullion Placers Ltd. plans constructing hydro-pumping plant on south fork of Quesnel River.

B. C., Tye — MINES — Bayonne Consolidated Mines, Ltd., preparing plans 375 hp. development on Summit Creek.

B. C., Vancouver—ABATTOIR, etc.—Union Packing Co., Ltd., Fraser Ave., plans abattoir and packing plant. $100,000.

B. C., Vancouver—FACTORY—Standard Tent & Awning Ltd., 925 Rogers Bldg., 470 Granville St., plans factory.

B. C., Vancouver—OIL DEVELOPMENT—Consolidated Oil Co. Ltd., plans development in spring. To exceed $100,000.

★ **B. C., Vancouver**—PLANT—Corp., c/o J. P. Meehan & Co., archt., 207 West Hastings St., plans paper pulp plant. To exceed $1,000,000. **Maturity indefinite.**

B. C., Vancouver—PLANT—Hydrozene Corp. Ltd., plans expansion program. $100,000.

B. C., Vancouver—PLANT—Southalta Oils Ltd., preparing plans development during 1936. $100,000.

N. S., Halifax—MINING DEVELOPMENT—Montague Gold Mines Ltd., A. R. Lawrence, mgr., plans development of property near Dartmouth. $100,000.

Ontario — GOLD MINING — Newman Dick Mining & Development Co., A. Gauthier, pres., Kirkland Lake, plans gold mining development in vicinity of Kirkland Lake. To exceed $250,000.

Ont., London — PLANT — Lawson & Jones plans by O. Roy Moore & Co., 489 Richmond St., constructing addition to plant. $40,000.

Ont., New Toronto — PLANT — Continental Can Co., 100 East 42nd St., New York, N. Y., D. H. MacFarlane, local mgr., purchases site on Birmingham St. and plans constructing can manufacturing plant. To exceed $100,000.

Ont., Sault Ste. Marie—MILL—Chromium Mining & Smelting Corp. Ltd., soon takes bids constructing 3rd furnace at company's plant and 100 ton mill at the mine. $150,000.

★ **Ont., Sault Ste. Marie**—POWER HOUSE—Great Lakes Power Co. Ltd., 526 Queen St. E., soon takes bids constructing power house on Montreal River, near here. $1,000,000. Private plans.

Ont., Sudbury—MILL—Bousquet Gold Mines, Ltd., 171 Yonge St., Toronto, L. Brooke, pres., Sudbury, soon takes bids constructing 50 ton mill. $40,000.

Ont., Woodstock — FACTORY — Bickle Fire Engine Ltd., Woodstock, and Seagrave Fire Engine Ltd., St. Catharines Ave., merging and firm name being changed to Bickle-Seagrave Ltd., R. S. Bickle, mgr., and plans addition to factory and install additional equipment.

Ont., Woodstock — PLANT — Honey Flake Products Ltd., M. O. Inglis, mgr., plans plant. $25,000-$40,000.

Que., Joliette—BAKERY—A. Harnoiset Fils Ltd., plans biscuit bakery, Champlain St. $50,000. Architect not appointed.

Que., Montreal — FACTORY — Phillips Cut Glass Ltd., R. A. Way, mgr., 2085 St. Timothy St., plans factory.

Que., Montreal—PLANT—Steel Co. of Canada Ltd., Notre Dame St. W., purchases 149,796 ft. site on Tracy St. for plant.

Que., St. Louis de France — BAKERY — La Boulangerie Mauricienne Ltd., plans modern bakery. $49,000.

Que., St. Roch — WAREHOUSE — George Paquet, representing Woodhouse Ltd. of London, England and Montreal, purchases site for constructing warehouse, here.

Que., Ulverton — POWER PLANT — Central Quebec Light & Power Co. Ltd., prepares plans 10,000 hp. plant on St. Francis River.

Que., Verdun—FACTORY—Canada Flooring Co. Ltd., Moffat Ave., purchases 75x107½ ft. site for extension.

BIDS ASKED

Conn., Hartford — WAREHOUSE — Pioneer Fruit & Comn. Co., 103 Conn. Blvd., J. C. DiPietro taking bids 1 story, basement, 65x75 ft. and 65x105 ft., brick, steel, concrete warehouse, Conn. Blvd., incl. overhead doors, produce warehouse and wholesale distribution center, cold storage facilities. $45,000. G. L. Dunkelberger, 44 Wolcott Hill Rd., Wethersfield, archt.

Ga., Atlanta—PLANT—International Harvester Co. of America, Chicago, Ill., and 122 East 42nd St., New York, Mr. Bush, local mgr., Whitehall St., Atlanta, bids about Mar. 1, ad-

†*Federal Government*

Industrial Buildings (Continued)

dition to present warehouse, incl. loading platform, general alterations and repairs, Whitehall St. $45,000. Private plans. Noted Dec. 7, 1934, C. D.—Dec. 13, 1934, E. N.-R.

Ill., Chicago—PLANT—South Side Brewing Co., 3700 South Halstead St., taking bids constructing plant addition. $60,000. J. Bednarik, 1643 West Garfield Blvd., archt.

Ill., Waukegan — PLANT — See "Contracts Awarded."

Ind., Kokomo—CONTINUOUS SHEET BAR MILL—See "Contracts Awarded."

Mass., Arlington—GARAGE—Gay & Proctor, archts., 234 Boylston St., Boston, taking bids 1 story, 60x100 ft., brick, steel, concrete garage, concrete found., Mass. Ave., for Wm. A. Muller Corp., c/o architects. To exceed $37,000, incl. equipment.

★ **Mich., Grand Rapids**—BODY PLANT—Fisher Body Corp. taking bids 1 and 5 story, 400x525 ft., brick, steel, rein.-con. factory building automobile bodies. Est. $7,000,000, incl. equipment, cranes, 100 craneways, dies, presses, machines for drawing seamless steel roof for turret tops. Private plans. Noted Jan. 2, C. D.—Jan. 9, E. N.-R.

N. Y., Niagara Falls—PLANT—Mathieson Alkali Wks., Inc., 2440 Buffalo Ave., taking bids plant addition, Buffalo Ave. To exceed $35,000.

O., Massillon—BOILER HOUSE—Eaton Mfg. Co., 739 East 140th St., C. I. Ochs, pres.-genl. mgr., taking bids on new boiler house and factory alterations. $40,000. George S. Rider Co., Marshall Bldg., Cleveland, archts. and engrs.

W. Va., Alloy—FURNACE and PACKING—Union Carbide Co., Niagara Falls, New York, taking bids about Jan. 22, rein.-con. furnace and packing building for plant.

CONTRACTS AWARDED

Ala., Birmingham—RESEARCH LABORATORY—Swann & Co., 913 Brown Marx Bldg., 2 story, basement, 50x140 ft., limestone research laboratory, to C. T. Allen, Martin Bldg.

Ala., Decatur — PLANT — Cooper-Wells Co. constructing new unit, to E. P. Childs, Decatur. Est. $50,000. E. Steinberg, 205 West Wacker Dr., Chicago, Ill., archt. Noted Jan. 9, C. D.—Jan. 1, E. N.-R.

Conn., Bridgeport—PLANT—Casco Products Corp., 1333 Railroad Ave., general contract 1 story, 84x188 ft., brick, steel factory addition, to E. and F. Constr. Co., 94 Wells St., $32,570; heating, plumbing, electrical work being done by owners. Noted Dec. 17, C. D.—Dec. 18, E. N.-R.

Fla., Pensacola—PLANT—Hygiea Coca Cola Bottling Co., Fairfax St., bottling plant, to Barge-Thompson Co., 136 Ellis St. N.E., Atlanta, Ga. Est. $100,000. Noted July 15, C. D.—July 18, E. N.-R.

Ga., Atlanta—STORAGE, etc.—Luckie Operating Corp., c/o Butler Bros., lessee, 169 Pryor St., altering 2 story storage and distribution, incl. air conditioning, on South Pryor and Garnett Sts., separate contracts awarded. $37,000 with equipment.

Ga., Atlanta—PACKING HOUSE—Star Provision Co., 600 Marietta St. N.W., c/o Isidore Heinman, mgr., constructing 2 story, basement, brick, cast stone, rein.-con. packing plant, to A. K. Adams & Co., 542 Plum St. N.W.

Ga., Atlanta—PLANT—Monarch Wine Co., 101 Wooster St., New York, distribution storage and plant alteration and equipment, separate contracts awarded. $37,000.

Ga., Moultrie—PACKING PLANT—Swift & Co., U. S. Yards, Chicago, Ill., 2 story, basement, brick, stone, rein.-con., structural steel addition to packing plant, to Brazell, Miller & Newbanks, Norris Bldg., Atlanta. Private plans.

Ill., Chicago—PLANT—Empire Packing Co., 3480 South Emerald St., constructing plant additions, separate contracts awarded. $40,000 or more.

Ill., Waukegan — PLANT — Johns Manville Co., 22 East 40th St., constructing plant additions, separate contracts and day labor. To exceed $150,000.

Ind., Kokomo—CONTINUOUS SHEET BAR MILL—Continental Steel Co., Kokomo, constructing continuous sheet bar mill, separate contracts. To exceed $100,000.

Ind., Mitchell—STORAGE, etc.—J. C. Groub Grocery Co., Mitchell, storage and distribution building, separate contracts awarded. $37,000 with equipment.

Ind., South Chicago—STEEL MILLS—Inland Steel Co., 46 in. reversing slabbing mill with auxiliary equipment, to Mesta Machine Co., West Homestead St., Pittsburgh, Pa. Est. exceeds $100,000. Also plans 4 new open hearth furnaces, to exceed $100,000.

Me., Portland—STORAGE—Portland Terminal Co., 266 St. John St., 1 story, 70x150 ft., steel superstructure railroad storehouse, concrete found., Bishop St., to Truscon Steel Co., 38 Chauncy St., Boston, Mass. Private plans.

Md., Baltimore — PLANT — James Distillery, Inc., 807 Key Hy., constructing plant addition, to State Building Co., 36th St. and Roland Ave. Est. $37,000.

Md., Cedarhurst—WAREHOUSE—Olde Tyme Distillers, Inc., constructing 5 story, 100x140 ft. barrel rack warehouse, to G. Walter Tovell, Eutaw and McCulloh St., Baltimore. Est. $75,000. Private plans.

Mass., Cambridge—SUPER-SERVICE STATION—American Oil Co., Park Square Bldg., Boston, 1 story, 30x90 ft., brick, concrete found., Mass. Ave., to C. R. Burns, 21 Doran Rd., Brookline, to exceed $37,000. W. J. Weir, 2 Thompson Sq., Charlestown, archt.

Mass., Chelsea—BULK STORAGE—American Oil Co., 122 East 42nd St., New York, 900 ton capacity steel tanks, to Chicago Bridge & Iron Wks., 37 West Van Buren St., Chicago, Ill. Noted Nov. 15, C. D.—Nov. 21, E. N.-R.

Mass., Chicopee—PLANT—Daniel O'Connell's Sons, Inc., general contractors, 480 Hampden St., Holyoke, plumbing for plant addition, for Hampden Brewing Co., North Chicopee (Williamsett Section), to James J. Dowd & Co., 109 Ely St., Holyoke***reinforcing steel, to Concrete Steel Co., 394 Washington St., Boston ***structural steel, to Robert B. Dearden, Meadow St., Willimansett***stone, to Archt. Stone Co., Turners Falls***excavation, plastering and painting by general contractor. Noted Dec. 18, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

Mass., Chicopee—PLANT—Hampden Brewing Co., North Chicopee, electrical work for 3 story, 60x133 ft. plant addition at Willimansett, to Richard A. Turner Co., Inc., 440 Worthington St., Springfield. Noted Dec. 18, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

Mass., Framingham—FACTORY—J. J. Convisor, general contractor, 333 Washington St., Boston, sublet contract for heating and plumbing in connection with construction of factory, to Morse Bros., 7 Pitts St., Boston, for Hodgman Rubber Co., Herbert St.***reinforcing steel, to Concrete Steel Co., 294 Washington St., Boston***structural steel and iron, to West End Iron Wks., 263 Columbia St., Cambridge*** elevator, to Portland Elevator Co., Inc., 133 Oliver St., Boston. Noted Dec. 30, C. D.—Jan. 2, E. N.-R., under "Contracts Awarded"

Mass., Roxbury—BUS STORAGE GARAGE—J. W. Bishop Co., general contractors, 100 Erie St., Cambridge, structural steel for bus storage garage, to A. O. Wilson Structural Steel Co., 40 Smith St., Cambridge, for Boston Elevated Railway, 31 St. James Ave., Boston***sprinklers, to Viking Automatic Sprinkler Co., 430 Statler Bldg., Boston***heating and plumbing, to Lappin Bros. Co., 17 Irving St., Malden***steel sash and reinforcing steel, to Truscon Steel Co., 38 Chauncy St., Boston. Noted Jan. 2, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Mass., Springfield—SHOPPING NEWS BUILDING—Springfield Merchants, Inc., c/o McClintock & Craig, archts., 458 Bridge St., 2 story, basement, 50x100 ft., brick, rein.-con., steel, South Main St., to Adams & Ruxton Constr. Co., 1387 Main St. To exceed $37,000. Bids Dec. 23, awarded Jan. 6.

Mich., Battle Creek—BAKERY—Geo. A. Weston Biscuit Co. Ltd., Toronto, Ont., reconditioning former Sanitary Equipment Co. plant into biscuit bakery, separate contracts awarded. Est. $350,000.

Mich., Battle Creek—POWER PLANT—Postum Co., Inc., Battle Creek, constructing power plant addition and extensions, incl. boiler to generate 100,000 lb. steam per hr. at 700 lb. pressure, also auxiliary equipment, turbo-generator, etc., to Stone & Webster Eng. Co., 90 Broad St., New York, N. Y. Est. exceeds $40,000.

Mich., Detroit—BREWERY—Tivoli Brewing Co., 10129 Mack Ave., constructing 2 story, basement, brick, steel, rein.-con. addition, plain found., Mack Ave., to Martin & Krausmann Co., 955 East Jefferson St. Est. $40,000.

Mich., Detroit—PLANT—Wayne Screw Products Co., 521 St. Jean Ave., H. Angell, in charge, constructing plant addition, separate contracts awarded. $40,000. Noted Dec. 5, C.D.—Dec. 12, E.N.-R.

N. Y., Burnside—CREAMERY—Bordens Farm Products, Inc., 110 Hudson St., New York, general contract 2 story, basement, 50x80 ft., brick, steel creamery, plain found., own forces. Owner will purchase materials and electrical equipment. To exceed $37,000. Noted Dec. 2, C. D.—Dec. 5, E. N.-R.

★ **N. Y., New York** — FACTORY — General Dyestuffs Corp., 230 5th Ave., general contract 9 story, brick, steel, Hudson St. between Leroy and Morton Sts., to Willton Constr. Co., c/o Francisco & Jacobus, 511 5th Ave., archts. Est. exceeds $1,500,000.

N. Y., Rochester — FACTORY — Eastman Kodak Co., Kodak Park, constructing additions to factories 126 and 105, Kodak Park, to Ridge Constr. Corp., Kodak Park, Rochester. Est. $38,000 and $75,000 respectively. Owner will purchase complete sprinkler system.

O., Campbell—MILL EQUIPMENT—Youngstown Sheet & Tube Co., additional cold steel rolling equipment for steel mills, to Mesta Machine Co., West Homestead St., Pittsburgh. Est. exceeds $50,000.

O., Canton—FACTORY—Timken Roller Bearing Co., 1835 Dueber Ave., awarded contract for 200 tons additional structural steel for plant addition, to Burger Iron Co., Canton. Noted Oct. 18, C. D.—Oct. 24, E. N.-R., under "Contracts Awarded."

O., Cincinnati—PLANT—American Book Co., c/o W. H. Howe, general contract 5 story, basement, 100x200 ft., brick, concrete, steel plant addition, plain found., 3rd and Butler Sts., to Ferro Constr. Co., 3rd and Elm Sts. Noted Dec. 6, C. D.—Dec. 12, E. N.-R.

O., Fostoria — FURNACE — National Carbon Co., 114th St. and Machison Ave., Cleveland, 1 story, 100x100 ft., steel furnace, to Gillmore-Carmichael-Olson Co., 1873 East 55th St., Cleve-

O., St. Bernard—PLANT—Cincinnati Chemical Wks., Norwood, constructing plant, to Meyer Hecht Co., 2824 Stanton St., Cincinnati. Est. exceeds $40,000.

Pa., Erie—PLANT—Gulf Oil Refining Co., 7th and Grand Sts., Pittsburgh, steel tanks for oil and gasoline storage plant, to Hammond Iron Wks., 17 Battery Pl., New York. Noted Oct. 11, C. D.—Oct. 17, E. N.-R., under "Contracts Awarded."

Pa., Homestead—STEEL MILL—Carnegie-Illinois Steel Co., Homestead, electric crane equipment for 100 in. steel mill, to Alliance Co., Alliance O., to Whiting Corp., Harvey, Ill., and to Shaw Box Crane Hoist Co., Muskegon, Ill. Noted Dec. 16, C. D.—Dec. 19, under "Contracts Awarded."

Pa., Langeloth—PLANT—Climax Molybdenum Co., 500 5th Ave., New York, 225 tons structural steel for new plant additions, to Lewison Steel Co., Pittsburgh. Noted Oct. 25, C. D.—Oct. 31, E. N.-R., under "Contracts Awarded."

Pa., Pittsburgh—PACKING PLANT—Pittsburgh Provision & Packing Co., Herrs Island, constructing 5 story, basement, steel, concrete addition to packing plant, cold storage and smoke house building, Herrs Island, to W. F. Trimble & Sons Co., 1719 Pennsylvania Ave. N.S. Noted Nov. 21, C. D.—Nov. 28, E. N.-R.

Pa., Pittsburgh — PLANT — Neville Co., Neville Island, Pittsburgh, constructing plant addition on Neville Island, to Burell Mase Eng. Co., Law & Finance Bldg., who will award separate contracts for owner. To exceed $37,000.

Pa., Pittsburgh — WAREHOUSE — Duquesne Brewing Co., 22nd and Mary Sts., brick, steel loading warehouse, 22nd and Mary Sts., to Navarro Corp., 6219 Broad St. C. R. Geisler, 337 Blvd. of Allies, archt. Noted Nov. 20, C. D.—Nov. 28, E. N.-R.

Pa., Port Allegany—FACTORY—Cameo Doll Co. acquired former Hall Planing Mill Co. plant and awarded separate contracts for remodeling and alterations for manufacture of dolls. To exceed $35,000. Cancelled plans to rebuild former plant destroyed by fire in October, with $75,000 loss. Noted Nov. 8, C. D.—Nov. 14, E. N.-R.

Pa., Williamsport—PLANT—R. & G. Knitting Mills, L. Greenberg, pres., West 3rd and Park Sts., altering and improving former carbarns, on Williamsport St. Ry. Co., comprising 60,000 sq.ft. floor space, for use for manufacturing underwear, lingerie, etc., separate contracts awarded. $50,000 or more. M. Klein, 65 Court St., Brooklyn, N. Y., archt.

Pa., Williamsport — PLANT — Williamsport Silk Co., constructing plant extensions and equipment, incl. 150 new looms, separate contracts awarded. To exceed $37,000.

S. D., Armour—POWER PLANT—Northwestern Public Service Co., O. C. Stikes, ch. engr., Huron, general contract 1 story, 51x72 ft. power plant building and equipment, to P. Kuipers, Mitchell, $25,000 and $100,000 respectively. W. J. Dixon, Mitchell, archt.

★ **Tex., Beaumont**—POLYMERIZATION UNIT Atlantic Refining Co., New York and Beaumont, refinery plant, incl. gas polymerization unit of Thermal type, with daily capacity of 1,200 bbl. gasoline, cracking unit of 20,000 bbl. daily production, at Atreco, 10 mi. south of here, to M. W. Kellogg Co., 225 Bway., New York, $1,500,000. Total est. $3,000,000. Noted Jan. 13, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

Tenn., Chattanooga—PLANT—United Engineers & Constructors, general contractors, 42 Bway., New York, 550 tons structural steel for plant, for U. S. Pipe & Fdry. Co., West 27th St., to Virginia Bridge & Iron Co., Roanoke, Va.; 550 tons, to Converse Bridge & Steel Co., 2408 Vance Ave., Chattanooga. Noted Jan. 7, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

Tenn., Memphis—STORAGE—Wheeling Steel Corp., Wheeling Steel Corp. Bldg., Wheeling, W. Va., constructing storage and distribution plant, to S. Malkin Constr. Co., 685 North Parkway, Memphis.

Wash., Seattle—PATTERN SHOP—American Can Co., 615 Orchard St., 2 story, 66x143 ft. pattern shop, 615 Orchard St., to Austin Co., Dexter Horton Bldg., $40,000. Noted Dec. 31, C. D.—Jan. 9, E. N.-R.

Wash., Tacoma—PLANT—Northwest Door Co., 1203 East "D" St., constructing plant, to N. S. Nelson & Son, Provident Bldg. Est. $50,000.

Ont., Windsor—WHARF WAREHOUSE—City, constructing addition to wharf warehouse, to Keystone Constr. Co. Ltd., Windsor, $53,533.

Que., St. Johns—FACTORY—Pierre Trahan, general contractor, St. Johns, painting factory for Schick Dry Shaver, Inc., to M. Lebean, St. Johns. Noted Dec. 30, C. D.—Jan. 2, E. N.-R.

---

†Federal Government.

Constr. News page 63

SAUERMAN
LONG RANGE MACHINES
POWER DRAG SCRAPERS
SLACKLINE CABLEWAYS
SLACKLINE SCRAPERS
TAUTLINE CABLEWAYS
CATALOG NO. 17
SAUERMAN BROS., INC.
CHICAGO ILLINOIS

Write for this 56-page Catalog. It is really a textbook on long range excavating.

Moving Earth At Lowest Cost

WHEN you have an excavation job that calls for moving dirt several hundred feet or more, isn't it logical to use a machine that will reach the entire distance and eliminate any rehandling of the dirt?

Sauerman Slacklines and Drag Scrapers will do just that—reach any distance from 100 to 1,500 ft. and handle the digging, hauling and disposal of the dirt in one operation.

SAUERMAN BROS., 432 So. Clinton St., Chicago

Sauerman Slacklines and Drag Scrapers are suited to any digging and come in many sizes for large or small jobs.

Add 8 to 20 Times More Life to Your Lumber

by pressure-treating it with ZMA or Creosote, processed by Eppinger & Russell Co. More than half a century wood preserving experience.

Treating Plants At:—Jacksonville, Fla. and Long Island City, N. Y.

WOOD PRESERVERS SINCE 1878

EPPINGER & RUSSELL Co.

82 Eighth Ave., NEW YORK CITY

WILLIAMS BUCKETS

Power-Arm, Multiple-Rope and Dragline

Write for Bulletins

THE WELLMAN ENGINEERING CO.

7000 CENTRAL AVE., CLEVELAND ~ OHIO

Buckets

Rope-reeve, Power-wheel, Link Types.

Capacities ½ to 15 yards.

INDUSTRIAL BROWNHOIST

GENERAL OFFICES: BAY CITY, MICHIGAN

A. LESCHEN & SONS ROPE COMPANY

Manufacturers of

"HERCULES" (Red-Strand) WIRE ROPE

See our page advertisement that appears monthly in the second issue of this paper.

New York
Chicago

5909 Kennerly Ave.,
ST. LOUIS

San Francisco
Denver

BEEBE BROS. ALL STEEL HAND HOIST SEATTLE U.S.A.

"THE STRONGEST GEARED POWER FOR ITS WEIGHT IN THE WORLD"

THREE SIZES: Two Ton "Lightweight," Five Ton "General Utility," 15 Ton "Special." Compact—Powerful—Safe. Adjustable length crank handle; Anti-friction babbitt bearings; Spring operated safety dog. Literature and list of dealers in principal cities on request.

BEEBE BROS.

2724 6th Ave. So., Seattle, Wash.

Two Speeds
Positive Internal Brake

Hayward Buckets

Use this Class "K" Clam Shell for excavating and hard digging.

THE HAYWARD CO., 48-50 Church St., N.Y.

Austin-Western

ROAD MACHINERY

Elevating Graders, Drags, Road Graders, Motor Graders, Road Rollers, Road Mix Machines, Culverts, Dump Cars, Dump Wagons, Scarifiers, Bulldozers, Trailers, Scrapers, Plows, Crushing and Washing Plants, Sweepers and Sprinklers, Shovels, Cranes, Snow Plows, Bituminous Distributors, etc. Write for complete information. The Austin-Western Road Machinery Co., Aurora, Ill. Cable Address: AWCO, Aurora. Branches in Principal Cities.

RAYMOND

CONCRETE PILES

RAYMOND CONCRETE PILE COMPANY

140 Cedar St. New York, N.Y.

Eight Sizes ⅜ to 1¼ yd.

BAY CITY Convertible

Power Shovels

Cranes Draglines

Excavators

BAY CITY SHOVELS, Inc.

Bay City, Mich.

LOCOMOTIVE CRANES
CRAWLER CRANES
SHOVELS

OHIO

THE OHIO LOCOMOTIVE CRANE CO.

BUCYRUS OHIO

FREDERICK SNARE CORPORATION

CONTRACTING ENGINEERS

Harbor Works
Dredging
Bridges
Railroads
Railroad Terminals

Difficult and unusual foundation and engineering problems a specialty

114 Liberty Street, New York

Havana, Cuba, Pasco De Marti 110-A, Altos. Philadelphia, 1524 Chestnut St.
Lima, Peru, Edificio "La Auxiliar". Cartagena, Colombia. P. O. Box 200

Warehouses
Industrial Plants
Sugar Mills
Power Plants, Dams,
Reservoirs, Pipe Lines